

Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

1
Ag 854E
Cap. 4

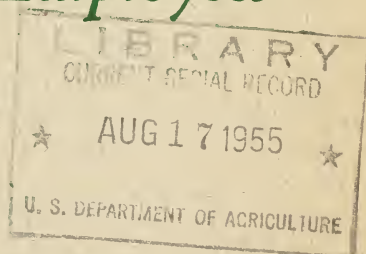
U. S. DEPARTMENT OF AGRICULTURE

GRADUATE SCHOOL

1955-1956



Education and Training For Federal Employees



UNDERGRADUATE, GRADUATE AND NON-ACADEMIC COURSES

WASHINGTON, D. C.

Calendar for 1955-56

FALL SEMESTER

Sept. 10-17	Registration (Late fee charged after Sept. 17)
Sept. 19-23	Classes begin
Sept. 30	Last day of registration for credit
	Last day of course transfer without late fee
Oct. 14	Deferred payments due
Oct. 28	Deadline for credit-audit change
Nov. 11	Veterans Day—no classes
Nov. 24	Thanksgiving Day—no classes
Dec. 23-30	Christmas holidays—no classes
Jan. 3	Classes resume
Jan. 16	Close of fall semester *

SPRING SEMESTER

Jan. 28-Feb. 4	Registration (Late fee charged after Feb. 4)
Feb. 6-10	Classes begin
Feb. 17	Last day of registration for credit
	Last day of course transfer without late fee
Feb. 22	Washington's Birthday—no classes
Mar. 2	Deferred payments due
Mar. 16	Deadline for credit-audit change
May 25	Close of spring semester *

SUMMER SESSION

June 4-9	Registration (Late fee charged after June 9)
June 11-15	Classes begin
June 15	Last day of registration for credit
	Last day of course transfer without late fee
June 22	Deferred payments due
July 4	Independence Day—no classes
July 13	Deadline for credit-audit change
August 17	Close of Summer Session *

* Classes which have missed sessions for any reason will continue until the deficiency is made up.

IMPORTANT

The provisions of this publication are not to be regarded as an irrevocable contract between the student and the United States Department of Agriculture Graduate School. The Graduate School reserves the right to change any provision or requirement at any time. The Graduate School further reserves the right at any time, to ask a student to withdraw when it considers such action to be in the best interests of the School.

GRADUATE SCHOOL
UNITED STATES DEPARTMENT OF AGRICULTURE
CATALOG

FALL — SPRING — SUMMER
1955 — 1956



*Please keep this catalog for use in
the Spring and Summer.*

This Catalog, published annually by the Graduate School, covers graduate and undergraduate programs for the Fall and Spring Semesters and the Summer Session. It is made as accurate as possible, but the right is reserved to make changes in details as circumstances require. A bulletin on correspondence study is available on request.

Contents

	PAGE
General Information	
Purpose of the School	5
Founding of the School	5
Accredited Standing	6
Administration	6
Teaching and Research Resources	6
Public Lectures and Seminars	7
Programs for Field Employees	7
Cooperative Internship Program	7
Certified Statements of Accomplishment	7
Scholarship for Federal Administrative Interns	8
Graduate School Publications	8
Correspondence Program	8
Regulations and Procedures	
Admission	9
Entrance Requirements	9
Veterans	9
Counseling Services	9
Transfer of Credit	10
Registration	10
Course Load	10
Fees	10
Payment of Fees	11
Attendance of Classes	11
Credit and Grades	12
Transcript of Credit	12
Withdrawal and Refunds	13
Courses of Instruction	
Biological Sciences	14
Languages and Literature	17
Mathematics and Statistics	29
Office Techniques and Operations	40
Physical Sciences	47
Public Administration	57
Social Sciences	73
Technology	85
National Institutes of Health Educational Program	99
Correspondence Program	104
Faculty	107
Index	123

United States Department of Agriculture

EZRA TAFT BENSON, *Secretary of Agriculture*

Graduate School

General Administration Board

CLARENCE M. FERGUSON, B.S.A., Administrator, Federal Extension Service, Chairman
E. L. BUTZ, Ph.D., Assistant Secretary of Agriculture
C. O. HENDERSON, M.S., Chief, Employee Performance and Development, Office of Personnel
R. E. McARDLE, Ph.D., Chief, Forest Service
J. A. McCONNELL, B.S., Administrator, Commodity Stabilization Service
TRUE D. MORSE, B.S.A., Under Secretary of Agriculture
RALPH S. ROBERTS, LL.M., Administrative Assistant Secretary
ROBERT M. SALTER, D.Sc., Chief, Soil and Water Conservation Research Branch, Agricultural Research Service
MACHENRY G. SCHAFER, M.A., Director of Personnel
BYRON T. SHAW, Ph.D., Administrator, Agricultural Research Service
ORIS V. WELLS, B.S., Administrator, Agricultural Marketing Service

Officers

T. ROY REID, D.Sc., Director
O. B. CONAWAY, JR., Ph.D., Assistant Director
M. LOUISE MALONE, M.A., Registrar
DWIGHT L. MYERS, Treasurer
FOSTER E. MOHRHARDT, M.A., Librarian
RUTH O. CARLOCK, A.B., Administrative Officer
VERA E. JENSEN, Information and Library Services

Graduate School Council

E. L. LeCLERGDepartment of Biological Sciences
J. KENDALL McCLARRENDepartment of Languages and Literature
B. RALPH STAUBERDepartment of Mathematics and Statistics
HENRY A. DONOVANDepartment of Office Techniques and Operations
HENRY STEVENSDepartment of Physical Sciences
JOHN H. THURSTONDepartment of Public Administration
BUSHROD W. ALLINDepartment of Social Sciences
R. G. HAINSWORTHDepartment of Technology
T. ROY REIDChairman

COMMITTEE ON CORRESPONDENCE STUDY AND
EXTENSION EDUCATION

E. J. PETERSON (Chairman)

LOUISE BERCAW
MARY L. COLLINGS
WILLIAM A. DEVAUGHAN
E. R. DRAHEIM
C. EDWIN DAVIS

CANNON C. HEARNE
HANS S. HOIBERG
JAMES L. ROBINSON
JAMES H. STARKEY
GALEN YATES

GEORGE YOUNG

COMMITTEE ON INTERNSHIP COOPERATION

R. Y. WINTERS (Chairman)

CARL B. BARNES
RUSSELL C. ENGBERG
GLADYS G. GALLUP
EARL R. GLOVER
GEORGE W. IRVING, Jr.

ETHAN A. NORTON
RUTH O'BRIEN
JOSEPH F. PECHANEC
WALTER M. SCOTT
F. V. WAUGH

AGRICULTURAL RESEARCH CENTER COMMITTEE

N. R. ELLIS (Chairman)

C. H. HOFFMANN
CHARLES A. LOGAN
RUTH O'BRIEN

RALPH G. SCHOTT
CLIFTON SWIFT
J. F. SYKES

MARTIN G. WEISS

COMMITTEE ON PUBLICATIONS

JAMES H. McCORMICK (Chairman)

THEODORA E. CARLSON
P. H. DeVRIES
FOREST J. HALL

HARRY P. MILEHAM
JEROME H. PERLMUTTER
D. HARPER SIMMS

COMMITTEE ON INTERNAL AUDIT

JOHN C. COOPER (Chairman)

L. GEORGE BARTLETT
CARL A. FRETTS

HOWARD E. MARSHALL
JOHN F. MCSHEA

COMMITTEE ON INFORMATION

FRANK L. TEUTON (Chairman)

CLARA B. ACKERMAN
WAYNE V. DEXTER

DAVID G. HALL
WILLARD H. LAMPHERE

General Information

PURPOSE OF THE SCHOOL

Since its establishment in 1921, the objective of the Department of Agriculture Graduate School has been to improve the Federal Service by providing needed educational opportunities for Federal employees. The Graduate School now offers a resident evening program in Washington and a small correspondence program. In addition, it presents lecture series, offers educational counseling, contributes to training programs in the Department of Agriculture, and participates in cooperative programs with land-grant and other educational institutions. Graduate study is the primary interest of the School but it also offers an undergraduate program. Graduate School classes are open to all qualified employees of the Federal Government and to other qualified persons as facilities permit.

FOUNDING OF THE SCHOOL

The statute which established the Department of Agriculture in 1862 gave it the responsibility to "disseminate agricultural information in the broadest sense of the word." Thus from the beginning employees of the Department have been educators, and it soon became apparent that if they were to be successful they needed opportunities to continue their training while employed.

In 1898, Secretary of Agriculture Wilson expressed the need of the Department for an organization like the Graduate School, particularly to provide post-entry education for young scientists coming into the Department's research programs. No action, however, was taken at that time. Shortly after World War I, when the need for qualified personnel became acute throughout the government, the Congressional Joint Committee on the Reclassification of Salaries recommended that the government departments give more attention to the development of opportunities within the Federal Service for the continuing education of their employees. Accordingly, the Secretary of Agriculture appointed in 1920 a special committee to explore the matter. After considering the committee's findings and consulting leading educational institutions and other government agencies, the Secretary established the Graduate School in 1921 and announced at that time: "I believe those who may be able to avail themselves of this opportunity will both enrich themselves and enhance the value of the service they render."

ACCREDITED STANDING

The Graduate School does not grant degrees and has never sought that authority. It prefers to give courses of standard graduate and undergraduate grade; to have the merits of these courses judged by the well-known competence of its instructors; and to cooperate with institutions which have the authority to grant degrees.

The United States Civil Service Commission accepts Graduate School credits, for examination and qualification purposes, on the same basis as those from accredited colleges and universities.

ADMINISTRATION

The government of the Graduate School is vested in a General Administration Board appointed by the Secretary of Agriculture. The functions of this Board correspond in general to those of boards of trustees of universities. The School is administered by a director and a small administrative staff. It is a nonprofit institution and receives no Federal funds.

The evening program in Washington is organized into eight departments. Each department is directed by a departmental committee composed of an appointed chairman and others of recognized competence in the respective fields. These committees are responsible for organizing and giving general administrative direction to the programs and activities of the departments. Within the departments, depending on the scope and specialization of the programs are divisional committees. The eight department chairmen and the Director make up the Graduate School Council. Similar committees direct other Graduate School programs.

TEACHING AND RESEARCH RESOURCES

The Graduate School recruits its staff from scholars in the Federal Service. Many of the faculty members, in addition to government service, have taught in the colleges and universities throughout the country.

The Graduate School student body enjoys the use of the noted library and laboratory facilities of Washington. In addition to a large library in the Department of Agriculture, containing more than a half a million volumes on both agricultural and non-agricultural subjects, students have ready access to the rich storehouses of the Library of Congress, the Smithsonian Institution, and the National Archives. Supplementing the Department Library as necessary is a collection of books supplied directly by the Graduate School.

PUBLIC LECTURES AND SEMINARS

Lecture series on current problems give Department employees and others an opportunity to hear authorities discuss current problems in agriculture and in other national and world affairs. Lectures which are especially relevant to the needs and interests of Department employees are given during official working hours. Registration is not required and no fees are charged.

PROGRAMS FOR FEDERAL EMPLOYEES OUTSIDE OF WASHINGTON

In order to increase educational opportunities for the field employees of the Federal government, the Graduate School has co-operated with universities in various metropolitan centers in the organization of programs of evening courses. At the present time, programs of courses designed especially to meet the needs of Federal employees are being offered by Boston University, New York University, and Temple University.

COOPERATIVE INTERNSHIP PROGRAM WITH LAND-GRANT INSTITUTIONS

Post-graduate and post-doctorate personnel in Land-Grant Colleges and Universities are afforded opportunities for research and for gaining other desirable experience under this program developed jointly by a committee from the Graduate Council of the Association of Land-Grant Colleges and Universities and the Graduate School. This work is under the direction of the Department of Agriculture professional staff in Washington, the Agricultural Research Center and elsewhere. Specific arrangements under this program are between personnel from these educational institutions and agencies in the Department. Details may be had from the Office of Personnel or the Graduate School.

CERTIFIED STATEMENTS OF ACCOMPLISHMENT

Certified Statements of Accomplishment are offered in the fields of Accounting, Administrative Procedures, Agricultural Economics, Editorial Practices, Meteorology, Oceanography, Public Administration, Statistics, and Surveying and Mapping upon the student's completion of specified programs of study. Each student interested in earning a Certified Statement of Accomplishment in any of these fields should receive approval, from the Registrar, of his proposed program of study. For complete details see the outlined program in the Department concerned.

These statements are offered to encourage the student to complete a well-organized program in his chosen field of study or work.

Each student who receives a certified statement also is given an informational transcript of his completed program which he may use as a public record of qualification. At the student's request, an official transcript is sent to an institution or agency designated by him.

SCHOLARSHIPS FOR FEDERAL ADMINISTRATIVE INTERNS

Each semester the Graduate School grants a limited number of scholarships, in the form of free tuition for one semester course, to persons who are participating in an official internship training program in one of the agencies of the Federal Government. Applications for these scholarships should be made by letter to the Registrar through an appropriate official in the agency in which the intern is training.

GRADUATE SCHOOL PUBLICATIONS

Publications of the Graduate School include:

1. A general annual *Catalog* which contains detailed information about the resident educational program in Washington, D. C.
2. Time Schedule and Supplement, published each semester—fall, spring and summer—which carries added details about the resident educational program in Washington.
3. Books and periodicals, published at irregular intervals containing: original contributions by faculty members; special lectures devoted to the advancement of the arts and sciences; and significant manuscripts prepared by employees of the Department of Agriculture, which the Department has been unable to publish. A partial list of these publications is given on the outside back cover of this *Catalog*.

CORRESPONDENCE PROGRAM

The small correspondence program of the Graduate School is designed primarily for the field employees of the Department of Agriculture, although the courses are open to others as the facilities permit. There are many other courses not offered by the Graduate School which are of interest to Department employees and are available through the correspondence programs of the colleges and universities throughout the country. The Graduate School is happy to assist a student to find courses in which he is interested.

The courses offered by the Graduate School are listed on page 104 of this *Catalog*. Students who wish more information about any of the courses or who wish to register in one of the courses may write to the Registrar, U. S. Department of Agriculture Graduate School, Washington 25, D. C.

Regulations and Procedures

ADMISSION

Admission to resident courses in the Graduate School is open to all qualified employees of the Federal Government, and to other qualified persons as facilities permit.

ENTRANCE REQUIREMENTS

Since the Graduate School does not offer degree programs, entrance requirements differ with the level of the course for which the student is registering.

Undergraduate courses, in general, are open to persons who are graduates of a standard high school or equivalent or who qualify for the course because of satisfactory work experience. For admission to more advanced courses college work in the same or related field is specified or understood. For other courses definite prerequisites may be stated. Year courses require the completion of the work of the first semester or its equivalent.

VETERANS

Graduate School resident courses are available to veterans under the Provisions of Public Laws 346 and 16 as amended, and Public Law 550. Registration for part-time study is charged against educational benefits only in the proportion that the number of semester hours bears to a full normal load.

Veterans who are re-entering Graduate School classes after an interruption of training or who are entering the Graduate School for the first time are advised to consult the Registrar of the Graduate School sufficiently in advance of registration that a program may be determined and the necessary arrangements made with the Veterans Administration.

COUNSELING SERVICES

Officers of the Graduate School are available, throughout the registration periods and from 9:00 a.m. to 5:00 p.m. each day for counseling on educational plans, whether courses are to be pursued in the Graduate School or in other institutions. In addition, where necessary, arrangements are made to refer persons having special problems to authorities in the particular field of work or study.

TRANSFER OF CREDIT

Careful planning is important for any prospective student, but particularly so for the Federal employee who wishes to make a substantial beginning in his educational program through the Graduate School, where degrees are not granted and credits must eventually be transferred to a degree-conferring institution. A student cannot assume that credit for work done at the Graduate School will be accepted by any particular college or university. Universities generally accept transfers of credit on the basis of the individual courses taken, the student's over-all program, and the quality of the work done by the student.

The student who wishes to take an advanced degree should consult in advance the dean of the graduate school of the institution where he expects to become a candidate for his degree to secure approval for whatever portion of his program the institution of his choice will accept from the Graduate School. The student who is deficient in basic undergraduate courses needed as a foundation for his graduate program will find many of them available in the large undergraduate program of the Graduate School. Others may be found in local universities.

A student who is planning work toward an undergraduate degree should consult in advance the dean of the institution from which he expects to receive the degree if he wishes credit toward the degree for work taken at the Graduate School.

REGISTRATION

The registration period for each semester is shown on the School calendar on the inside front cover. A late fee per course is charged for registration after the opening of the semester. After the second week of classes in the fall and spring semesters, and after the first week in the summer session, students may register for credit only with the approval of the instructor and the Registrar. Registration is not completed until the required fees have been paid.

COURSE LOAD

Students employed full time may carry more than two courses only with the permission of the Registrar.

FEES

Course Fees. In general, fees are computed at \$12.00 per semester hour credit.

Late Fees. There is a \$2.00 per course late registration fee and a \$1.00 per course late transfer fee as shown in the School Calendar.

Reinstatement Fee. Students who fail to meet payments when due are charged a reinstatement fee of \$2.00 per course in addition to all accrued fees.

Laboratory Fee. Laboratory or materials fees are listed in the Schedule of Classes for each semester, in connection with the courses for which they are charged.

Service Fee. A fee of \$1.00 per course is charged each student using the deferred payment plan.

Transcript Fee. There is a 50¢ fee for each copy of a student's record on the regular Graduate School form or on the form of another institution or state board of education.

PAYMENT OF FEES

Fees are due and payable in advance at the time of registration. Registration is not complete and no student is permitted to attend classes until all fees have been paid.

An arrangement may be made at the time of registration for payment of fees in two installments, one half plus a service fee at the time of registration, and the balance by the end of the fourth week in the fall and spring semesters, and by the end of the second week in the summer session.

A student who fails to meet payments when due will be suspended and may not attend classes until he has been reinstated and has paid all accrued fees as well as a reinstatement fee of \$2.00 per course.

All fees are payable at the Graduate School business office, Room 1031, South Building, United States Department of Agriculture.

ATTENDANCE AT CLASSES

Students are expected to attend all class sessions and not to absent themselves without adequate reason.

Absences do not relieve the student from responsibility for work required while he was absent, and the burden of proof that the work was done rests with the student. In courses in which the work cannot be satisfactorily tested by written examination, the instructor shall be the judge of the relation of the student's attendance or non-attendance to his grade. A student registered for credit who is absent more than 25% of the class periods receives a mark of "W," withdrawn, unless he makes up all required work. Auditors who are absent more than 25% of the class periods receive the mark of "W."

CREDIT AND GRADES

Academic Credit. Persons registering for academic credit must satisfy all prerequisites for admission to the course as generally stated or specified in the course description.

Audit. An auditor must meet the same prerequisites as a credit student. He receives full privileges of class participation if he chooses to exercise them. An auditor does not receive a grade; he receives only a mark of AUD.

Change from Audit to Credit. A student may change his registration from audit to credit, or vice versa, within thirty days after the beginning of the semester in the fall and spring, and within three weeks after the beginning of the summer session. The request for change must be made in writing to the Graduate School. Special forms are available at the School office.

Grades. At the close of the semester students receive written notice by mail of grades received. The following letter grades are used:

A	Excellent
B	Good
C	Fair
D	Passable
F	Failure
Aud	Auditor
Inc	Incomplete
W	Withdrawn

TRANSCRIPT OF CREDIT

Inclusion in Personnel Record for Department of Agriculture Employees. To aid in effecting its promotion-from-within policy, the Department has provided (USDA Administrative Regulations, Title 8, Chapter 42, paragraphs 1548-1551, dated 10-13-48) that a record of Graduate School credits earned by its employees will be placed in official personnel files of the agency. Unless specifically requested by the employee that such action not be taken, the Graduate School will forward, upon completion of the courses or at the end of the year, a copy of the student's record, without cost to the employee, to the personnel officer of the unit of the Department of Agriculture in which the student is employed.

Transcripts for Employees of Other Agencies. Students who are not Department of Agriculture employees may obtain a transcript for their personnel files or for other purposes by requesting it in writing to the Graduate School with the payment of the transcript fee of fifty cents.

WITHDRAWAL AND REFUNDS

Application for withdrawal from Graduate School classes must be made in writing to the Registrar. A form for this purpose is available in the Graduate School Office. *Reporting the dropping of a course to an instructor does not constitute an official withdrawal.* Permission to withdraw will not be given to a student who does not have a clear financial record.

Refund of tuition fees only will be granted in cases of official withdrawal according to the following schedule:

<i>Fall and Spring Semesters</i>	<i>Refund</i>
During first and second weeks of term	Tuition less \$5.00 per course registration fee.
During third and fourth weeks of term	60% of tuition (a minimum of \$5.00 per course will not be refunded).
During fifth and sixth weeks of term	50% of tuition.
<i>Summer Session</i>	
During first week of session	Tuition less \$5.00 per course registration fee.
During second week of session	60% of tuition (a minimum of \$5.00 per course will not be refunded).
During third week of session	50% of tuition.

Refunds will be computed as of the date the application for withdrawal is received in the Graduate School Office. In no case will tuition be reduced or refunded because of non-attendance in classes. No refund will be made of laboratory or other incidental fees.

Since commitments for instruction and other arrangements are necessarily made in the beginning of the semester, no refunds for any reason can be made except in accordance with the above schedule.

—O—

The Graduate School reserves the right to cancel any course if registration does not warrant continuance; to discontinue, postpone or combine classes; to change instructors; to change classroom assignments; to make any changes deemed advisable in registration and in fees; and to require the withdrawal of any student at any time for such reasons as the School deems sufficient.

Biological Sciences

DEPARTMENTAL COMMITTEE

E. L. LeCLERG (Chairman)

RONALD BAMFORD
LAWRENCE V. COMPTON
FLOYD S. DAFT
N. R. ELLIS
RALPH E. HODGSON (Vice-chairman)

EDWARD F. KNIPLING
DANIEL L. LEEDY
KARL S. QUISENBERRY
ALBERT H. MOSEMAN
BYRON OLSON

—O—

Scientific efforts have been greatly intensified in recent years with the result that research discoveries have a direct bearing on the activities of every individual and organization. Many government workers in fields only indirectly related to biology often need an understanding of basic principles in the biological sciences to do a competent job in their own fields. On the other hand, government workers in the biological sciences are continually faced with the problem of keeping abreast of the rapid advances in the application of these principles and new gains in basic knowledge.

The Department of Biological Sciences has arranged a series of courses to meet the needs of each of these groups. Unless laboratory work is specified, the courses are non-laboratory. The advanced courses are taught as seminars. All of the courses are taught by outstanding specialists from Federal and other research institutions.

In addition to the courses listed below, the Graduate School offers several courses in the biological sciences at the National Institutes of Health in Bethesda. These courses may be found on page 99 of this catalog.

—O—

1-126. Disease Classification and Medical Terminology

Fall, 2 credits

LOUISE BOLLO

Designed for medical secretaries, librarians, diagnosis coders, social workers, statisticians, and other workers in various health programs. Sources and meanings of the hundreds of disease entities encountered in hospital records, death certificates, causes of disability, etc. and the basic principles of disease classification. Helpful to persons who are interested in the tabulation and measurement of disease but who have not had a formal medical education.

[1-300.] Fundamentals of Entomology (1956-57 and alternate years)

Spring, 3 credits

REECE I. SAILER

1-427. Physiology of Bacteria

Year, 3 credits each semester

ARTHUR K. SAZ

The basic pathways of carbohydrate, protein, fat and amino-acid metabolism. Nutrition of microorganisms. Relationship to higher forms.

Topics covered also include biochemistry of nitrogen fixation, utilization of mutants for elaboration of metabolic pathways, and current status of modes of actions of antibiotics. *Prerequisite:* Organic chemistry or biochemistry or permission of instructor.

[1-512.] Medical and Veterinary Entomology (1956-57 and every third year)

Year, 2 credits each semester

Instructor to be announced

[1-570.] Design of Experiments in Biological Sciences (1956-57 and alternate years)

Year, 2 credits each semester

E. J. KOCH

[1-603.] Advances in Plant Breeding and Genetics (1957-58 and every third year)

Fall, 2 credits

MARTIN G. WEISS and SPECIALISTS

[1-609.] Recent Developments in Plant Physiology (1956-57 and every third year)

Fall, 2 credits

MARION W. PARKER and SPECIALISTS

1-620. Recent Advances in Weed Control

Spring, 2 credits (every third year) WARREN C. SHAW and MARION W. PARKER

A presentation of theoretical and practical aspects of weed control in relation to agricultural economy, including classification, distribution, development, and destruction of weeds; the description and classification of herbicidal compounds; and control by mechanical, biological, and competitive cropping practices. Attention will be given to methods of weed control in field crops, horticultural crops, lawns and turf, and in special situations including non-agricultural lands, irrigation systems, etc. This class meets at the Agricultural Research Center, Beltsville, Maryland. *Prerequisite:* A basic knowledge of plant physiology and organic chemistry or related subjects.

[1-702.] Radioisotopes and High Energy Radiation in Biology (1956-57 and every third year)

Spring, 2 credits

STERLING B. HENDRICKS and MERRILL E. JEFFERSON

SPECIAL PROGRAM IN PLANT QUARANTINE STUDIES

The following courses form a special in-service training program in plant quarantine studies, and are given in New York City with the cooperation of the Plant Quarantine Branch, Agricultural Research Service.

1-515. Plant Quarantine Entomology

Schedule to be arranged, 6 credits

IRA A. LANE

A concentrated, technical course in entomology especially designed to fill a need on the recognition to family of immature forms frequently encountered in plant quarantine work; to familiarize the participant with insect pests, the hosts, distribution and avenues of entry to notoriously dangerous forms not known to be established or widely distributed in the United States.

1-615. Plant Quarantine Pathology

Schedule to be arranged, 4 credits WALTER S. FIELDS and CHARLES S. TUTHILL

A specially designed program for regulatory officials interested in quarantine phytopathology. Emphasis is placed on detection, recognition, and nomenclature of disease-causing organisms frequently encountered in plant quarantine operations, particularly those not known to occur or be widely distributed in the United States.

1-708. Plant Quarantine and Plant Protection

Schedule to be arranged, 10 credits

IRA A. LANE

A special course arranged for foreign trainees who are studying plant quarantine methods in the United States. Course includes study of the interrelationships of agencies of the U. S. Department of Agriculture, regulatory and control organization and policy, basic quarantine legislation, fundamental principles affecting promulgation of quarantines and restrictive orders. Field observations and participation in operational activities of the Plant Quarantine Branch at ports of entry. Review and observation of field control projects and quarantine operations in the Northeast, Southeast, and Southwest Regions.

Languages and Literature

DEPARTMENTAL COMMITTEE

J. KENDALL McCLARREN (Chairman)

GEORGE E. BEAUCHAMP
J. P. BLICKENSERFER
ERWIN JAFFE
FOSTER E. MOHRHARDT

KENNETH W. OLSON
LESTER A. SCHLUP
FRANKLIN THACKREY (Vice-chairman)
R. LYLE WEBSTER

IMPORTANCE OF ENGLISH, WRITING AND SPEECH

Among students preparing for technical careers and among busy people employed on the basis of their technical competence, there is an inevitable tendency to concentrate on subject-matter specialties. Technical knowledge is of no value, however, unless it can be communicated to others. It is common knowledge in the Government service and in industry that nothing so much retards the progress of many young technicians, scientists, and other professional personnel as their inability to write and speak effectively.

CERTIFICATE OF ACCOMPLISHMENT IN EDITORIAL PRACTICES

Certified Statements of Accomplishment in Editorial Practices are granted to students who have completed an organized course of study intended to provide basic training for responsible editorial and publications work. The program leading to this certificate should be of special interest to persons who wish to enter editorial work and to those now employed in editorial or publications work who wish to prepare themselves for job advancement.

Persons who wish to enter the profession should have a good, general educational background. It is recommended that students who wish to work toward the certificate have at least two years of college work, preferably a college degree, or work experience in a subject matter field.

Requirements

Students seeking this certificate should consult with the Registrar and obtain approval of their proposed course of study early in their academic program. Equivalent courses will be accepted by transfer from other institutions.

1. A demonstrated facility in English grammar and composition. This requirement may be met by successful completion of an examination to be given as a part of the course, Principles of Editing.

2. Twenty-four semester hours of credit with an average grade of "B" or better in the following courses:

a. Required courses: (14 credits)

Principles of Editing (3)
 Advanced Practice in Editing (3)
 Printing Procedure and Layout Design (2)
 Editing Technical Manuscripts (2)
 Preparation of Popular Publications (2) (Proposed)
 Seminar Problems in Editing (2) (Proposed)

b. Editing Electives: (6 credits selected from the following)

Introduction to Official Writing
 Workshop in Official Writing
 Readable Writing
 Technical Writing
 Basic Reference Service and Reference Tools
 Introduction to Bibliographic Science
 Indexing
 Graphic Methods of Presenting Statistics
 Feature Writing

- c. Subject Matter Electives:* Four hours credit in subject matter courses as recommended by the student's employer or as selected by the student. May be selected from the Editing Electives listed above if those are appropriate to the position for which the student is preparing. The four hours may be waived by the Graduate School departmental committee for students who have college work or acceptable experience in the subject matter field.

—O—

ENGLISH—GRAMMAR AND WRITING

2-35. English for Secretaries—Rapid Review

Summer, non-credit

JAMES O. HARMON

Sentence structure, capitalization, punctuation, vocabulary, and spelling.

2-95. Improving Reading Ability

Fall, non-credit. Repeated in Spring

CARL MURR

A course to improve individual reading skills and techniques. Students are given training to increase their reading rate without loss in comprehension. Tachistoscope and silent reading films are used for group training with additional time for individual training with the reading accelerator. Course also includes ophthalmograph and telebinocular tests to determine eye movements and visual acuity.

2-112. Practical English Usage

Fall, 2 credits. Repeated in Spring and Summer

CHARLOTTE MANGOLD
VERNE L. SAMSON

This course enables students through practice to master the fundamentals of correct English. Troublesome problems of English usage, sentence structure, choice of words, style, and grammar, are studied as aids to clear and forceful writing of letters, memoranda, and reports.

2-113. Sentence Revision

Spring, 2 credits

VERNE L. SAMSON

Designed for students who wish to improve their writing. Review of the grammatical elements of the sentence, a study of established patterns of sentence construction, and constant practice in rewriting sentences. *Prerequisite:* Completion of Practical English Usage, Descriptive English Grammar, or the consent of the instructor.

2-119. Vocabulary Building

Fall, 2 credits. Repeated in Spring and Summer

CHARLES D. MURPHY

Study of the sources and origins of words in order to gain insight into their present meanings. Principles of word formation; dictionary study and exercises in word selection. The course stresses the most common Latin and Greek roots used in forming English words.

2-222. English Composition

Year, 3 credits each semester

KATHRYN P. WARD
KAY B. WEBER

Equivalent of freshman English. An introductory course in writing and English usage, designed especially for those who need a course preparatory to more advanced English studies. Special attention given to the fundamental principles and mechanics of good writing—grammar, punctuation, spelling, diction, etc. Exercises in writing short and long themes and in studying, analyzing, and evaluating selected English prose texts.

2-223. Descriptive English Grammar

Year, 2 credits each semester

SUSAN E. HARMAN

A course in the study of grammatical principles, stressing sentence structure and correct English form. Lectures on the history and development of inflectional and derivational forms. Exercises in diagramming and in analyzing examples of good and bad English.

2-224. Readable Writing

Fall, 2 credits

AMY G. COWING

Teaches you how to write so that more people will read and understand your articles and bulletins; how to estimate how easy or hard the reader will find your writing; how to organize your writing for easy reading. Deals briefly with the use of pictures and other visual aids to reading. Much of the course centers around use of the Flesch Readability Formula and consists of lectures and workshop sessions in which students make practical application of writing principles. *Prerequisite:* A course in English composition.

2-226. Introduction to Official Writing

Fall, 2 credits. Repeated in Spring

J. KENDALL McCLARREN
JEROME H. PERLMUTTER

This course covers the principles of clear statement which must be applied to all forms of writing. Emphasis is given to the special requirements of official

writing in economic and scientific research, government organization, and policy. The course considers ways of making official writing clear, vigorous, and readable in spite of the necessary rules and restrictions. It is designed for people who are not professional writers but whose work calls for some copy preparation or report writing. One major writing project is required. *Prerequisite:* College freshman English or the equivalent in writing experience.

2-227. Workshop in Official Writing

Spring, 2 credits (alternate years)

J. KENDALL McCLARREN

This course is a continuation of Introduction to Official Writing. The informal workshop approach is designed to meet the individual needs of students whose work requires some writing. Writing principles developed in the previous course are applied to reports, scripts, releases, and other media. *Prerequisite:* Introduction to Official Writing or its equivalent.

2-235. Fiction Writing

Fall, 2 credits. Repeated in Spring

H. RICHARD SHEA, JR.

Stresses such fiction fundamentals as plotting, characterization, dialogue, story organization, testing readability and interest, and increasing dramatic quality of writing. Emphasizes writing techniques which increase salability of student manuscripts by discussing editorial taboos, ways to obtain salable story ideas, and methods of marketing manuscripts. *Prerequisite:* English Composition or equivalent, or permission of instructor.

2-242. Advanced Fiction Writing

Fall, 2 credits. Repeated in Spring

OLGA MOORE ARNOLD

Discussion, criticism and suggestions for revising student manuscripts. Emphasizes methods of slanting for particular markets, discussions of what editors buy and why, and ways to polish manuscripts to increase sales possibilities. *Prerequisite:* Fiction Writing or equivalent.

2-280. Feature Writing

Fall, 2 credits

DUNCAN N. SCOTT

Stresses how to find article ideas, how to do the research necessary to develop them into salable articles, best methods of presentation of material, ways to polish writing to make it more salable, ways to determine magazine needs, how to slant material for particular magazines, and how to test readability and interest of writing. *Prerequisite:* English Composition or equivalent, or permission of instructor.

2-281. Advanced Feature Writing

Spring, 2 credits

DUNCAN N. SCOTT

Discussion, criticism and suggestions for revising student manuscripts. Emphasizes methods of slanting for particular markets, discussions of what editors buy and why, and ways to polish manuscripts to increase sales possibilities. *Prerequisite:* Feature Writing or equivalent.

2-450¹ Technical Writing

Fall, 2 credits

MARGUERITE GILSTRAP and MAURICE FRIED

A course designed to help scientists and economists improve their research reports and articles for professional publications. The first 3 weeks are devoted to a survey of the fundamentals of writing the technical report: its characteristics, parts, functions, the steps in preparation, the process of criticism. The remainder of the term is spent in the preparation, criticism, and revisions of reports and articles—written for official use when possible. *Prerequisite:* Undergraduate degree in one of the sciences, engineering, economics, or similar technical field.

LITERATURE

2-330. Great Books I

Year, 2 credits each semester *

M. CLARE RUPPERT

Group discussion, under leadership, of important works in poetry, history, philosophy and criticism. The leader will try to help with the reading and understanding, but the books themselves will be the teachers. The intention of the course is to give insight into perennial, and therefore contemporary, problems, not historical and literary information. The only qualifications required are an interest in ideas and belief in free discussion. With few exceptions the books will be read in their entirety. One, two, or three meetings will be given to a book depending upon its length. Discussion will center around the following authors:

Fall Semester: Bible, *Book of Job*; Homer, *Odyssey*; Sophocles, *Oedipus Rex*, *Antigone*; Plutarch, *Lives: Alexander and Caesar*; Plato, *Apology* and *Crito*; Plato, *Republic*, books 4-6; Aristotle, *Politics*, *Ethics*; Marcus Aurelius, *Meditations*; St. Augustine, *Confessions*; St. Thomas Aquinas, *On the Law*.

Spring Semester: Bible, *Gospel of St. John*; Dante, *Divine Comedy*; Machiavelli, *the Prince*; Montaigne, *Selected Essays*; Shakespeare, *King Lear*, *Hamlet*; Rousseau, *Social Contract*; *Federalist Papers*; Goethe, *Faust*; Marx, *Communist Manifesto*; Veblen, *Theory of Leisure Class*; Adams, *Education of Henry Adams*.

[2-332.] Great Books II

Year, 2 credits each semester * (Not offered in 1955-56)

JOHN T. CHENEY

Group discussion, under leadership, of works of the authors listed. While the leader will endeavor to help with the reading and understanding, the books themselves may be considered the teachers. The intention is to give insight into perennial, and therefore contemporary, problems, not historical and literary information. The central theme of the Fall semester is the relationship of fact and information; of the Spring term, individual freedom and responsibility to society. Qualifications required are an interest in ideas, and belief in free discussion; it is in addition urged that the students have completed Great Books I. Authors to be read include:

Fall Semester: Thucydides, *History of the Peloponnesian War*; Aristophanes, *Lysistrata*; Aeschylus, *Agamemnon*; Euripides, *Medea*; Hobbes, *Leviathan*; Plato, *Phaedo*; Milton, *Areopagitica*; Aristotle, *Poetics*; Plato, *Symposium*; Cervantes, *Don Quixote*.

Spring Semester: Kant, *Fundamental Principles*; Ibsen, *Master Builder*, *Wild Duck*, *Ghosts*; Xenophon, *Persian Expedition*; Lucretius, *On the Nature of Things*; Tawney, *Religion and the Rise of Capitalism*; Sophocles, *Oedipus at Colonus*.

2-334. Great Books III

Year, 2 credits each semester * (alternate years)

JOHN T. CHENEY

For students who have completed Great Books I or II or a similar course in Great Books, and who wish to go on with their readings. This course is given alternately with Great Books II.

Readings for 1955-56 will be selected from the following: Herodotus, *History of Egypt*; Plato, *Meno*; Aeschylus, *Prometheus*; Euclid, *Elements*; Gibbon, *Decline and Fall*, Chapters 15, 16; Milton, *Paradise Lost*; Dante, *Inferno*; St. Thomas Aquinas, *Selections*; Swift, *Gulliver's Travels*; Shakespeare, *Macbeth* or *King Lear*; Thoreau, *Civil Disobedience*; Freud, *General Introduction*; Mark Twain, *Huckleberry Finn*; and William James, *Selections*. Prerequisite: At least one semester of Great Books I or II.

* Students may attend both semesters or either semester.

INFORMATION METHODS

2-220. Indexing

Fall, 2 credits

MABEL H. DOYLE
MAUDE K. SWINGLE

This course is intended primarily for those interested in making indexes for periodicals, bulletins, reports, and books. Emphasis will be placed on general procedures and matters of policy as well as on basic principles and techniques. Specific types of indexing adapted to various subjects and popular style, contrasted with technical and scientific styles, will be studied. Examples of different kinds of indexes will be shown and opportunity given for practical work in the preparation of indexes, including the making of cross references, alphabetizing, and editorial preparation of index cards and manuscripts for the printer. *Prerequisite:* A knowledge of library or editorial work is desirable.

2-225. Principles of Editing and Their Application

Fall, 3 credits

F. L. ERHARDT and HARRY P. MILEHAM

Intended primarily for those seeking information on editorial techniques involved in handling manuscripts after they leave the author's hands and until they are issued in printed form. Discussion of the fundamental principles of editing, including the organization or rearrangement of material for effective presentation; rhetorical style in relation to subject matter; word forms, sentence structure and effective use of English; the Style Manual of the Government Printing Office; considerations governing titles, tables of contents, headings, footnotes, illustrations, literature citations and bibliographies, and statistical checking; the principles of table formation and arrangement; the relation of type to subject matter and the techniques of printing; and the fundamentals of indexing and proofreading. Opportunity is afforded to apply these principles in practical work in editing, which is then discussed in class. A trip to the Government Printing Office is arranged to note and study operations there.

2-360. Advanced Practice in Editing

Spring, 3 credits

GENIANA R. EDWARDS and SPECIALISTS

Advanced instruction in literary and statistical editing and handling of graphic materials. Students will edit a practice manuscript requiring reorganization, extensive editing, and uniform styling. Several Government agency styles for citation, tables, graphics, and other details will be compared, and adaptation of style meeting special requirements yet conforming to Government Printing Office rules will be studied. Administrative procedures for work on pamphlets, magazines, etc., will be outlined. *Prerequisite:* Principles of Editing and Their Application, or consent of instructor.

2-365. Editing Technical Manuscripts

Fall, 2 credits

B. H. MEWIS

The role of the editor, including the human relations aspects, the relative responsibilities of editor and author, and the ethical basis for editing. Editorial evaluation of technical manuscripts, including organization, general presentation, and functions of component parts; review and evaluation of technical reports edited by students. *Prerequisite:* Principles of Editing and Their Application, or consent of instructor.

2-237. Printing Procedure and Layout Design

Spring, 2 credits

ELMO J. WHITE

Printing processes and printing media; composition; book binding; typography and design; printing types; illustrations, including photo-engraving process and photographs; printing design, rough layouts, finished layouts, methods of

copy fitting; printing for the Government, including agency responsibility, GPO responsibility, and agency procedure for procuring printing; other printing media, including silk screen, ozalid, varitype, cold-type processes, and others; regulations and specifications of the Joint Committee on Printing, GPO paper catalog, Style Manual, printing and binding regulations.

The course is intended for those who plan, prepare, or procure printing, duplicating, and distribution of books, pamphlets, folders, posters, charts, forms, and other printed or duplicated matter.

2-240. Audio-Visual Aids in Information and Education

Fall, 2 credits

GALE GRISWOLD

A survey of the many ways audio-visual aids can be used in training, employee relations, and information and education programs. Covers not only newer materials such as motion pictures, filmstrips, and recordings, but also modern uses of photographs, charts, graphs, maps, and the like—even the art of using a blackboard. Gives practical suggestions on the most effective use of these aids for different purposes—developing physical skills, imparting information, changing attitudes, and otherwise influencing human behavior. Lectures and demonstrations with guest speakers presenting material on special topics. Each student will have the opportunity to choose his own problem for intensive study.

LIBRARY TECHNIQUES

The following courses are designed as non-professional library courses, offering a background of information and training for the sub-professional library assistant and other persons whose work requires a knowledge of these techniques, such as teachers, research assistants, etc. Students may take the courses in any sequence.

2-135. Introduction to Cataloging and Classification

Spring, 2 credits

KENNETH W. SODERLAND

The philosophy of organization of the materials of communication; typical rules for descriptive and subject cataloging; the coordinate index and other forms of indexing; the structure of systems of classification; the Library of Congress system of classification.

2-136. Principles of Library Organization

Spring, 2 credits

JOSEPH T. POPECKI

The system and function of a library based on its component parts and services which obtain regardless of size or purpose; the organization of function and service for utmost efficiency.

2-137. Basic Reference Service and Reference Tools

Fall, 2 credits

MARION E. BONNIWELL

The process of satisfying intellectual inquiry; sources of information; study and comparison of a basic list of 150 reference tools with the exception of general bibliography.

2-138. Introduction to Bibliographic Science

Fall, 2 credits

JOSEPH T. POPECKI

Bibliographic science and bibliographic style for beginners; variations and forms of bibliography; study and comparison of the general bibliographic tools and indexes of chief importance.

[2-145.] Law Librarianship (1956-57 and alternate years)

Year, 2 credits each semester

RALPH H. SULLIVAN

2-151. Introduction to Map Library Techniques

Fall, 2 credits

CATHERINE I. BAHN

Presents background of the present-day organization of map libraries. The selection, acquisition, and use of maps. Actual experience in basic methods of classification and cataloging. Preparation and use of map index. Processing and shelving maps. Basic reference service required for the interpretation and use of map collections. *Prerequisite:* Basic understanding of map reading, and working knowledge of geography or cartography, acquired through work in a map library, or by taking 5-114 Maps and Charts or 8-125 Introduction to Cartography.

SPEECH**2-228. Fundamentals of Speech**

Fall, 2 credits. Repeated in Spring and Summer

VIRGINIA B. ROSER

GORDON D. BRIGHAM

Through the preparation and delivery of short original speeches the student gains poise, assurance, and the ability to express himself clearly and accurately. Strict adherence to time limit quickens mental processes and develops discrimination in the selection of speech material. Voice, articulation, and pronunciation drills. Posture, movement, and gesture. Learn to speak by speaking at each class meeting. Constructive criticism.

2-229. Public Speaking

Fall, 2 credits

GEORGE E. BEAUCHAMP

Students enrolling for this course should have had Fundamentals of Speech or some speech-making experience. Emphasis is placed on determining what one's purpose is in speaking, and accomplishing that purpose effectively. How to be interesting and clear, how to develop and support ideas, and how to handle discussion. Each student speaks and receives personal speech suggestions at each class meeting.

2-232. Voice and Remedial Speech

Fall, 2 credits. Repeated in Spring

STANLEY L. BERLINSKY

WALTER B. EMERY

Study and intensive drills in voice production, flexibility, range, articulation, and enunciation. Training and practice are designed to improve vocal conditions for all speech purposes and to remedy minor speech difficulties. In order that students may receive more individual attention, registration is limited to twenty.

2-350. Conference Methods Workshop

Fall, 2 credits. Repeated in Spring

C. O. HENDERSON and L. K. WRIGHT

Designed for persons who wish to take an active part in meetings of any kind—staff meetings, conferences, civic organization meetings, church groups, P.T.A. meetings, club work, or conventions. The class is conducted by means of participation, demonstration, lecture, analysis, and evaluation. Topics include types of meetings, agenda, arrangements, order of business, chairmanship, committees, fundamental parliamentary procedure, guiding principles, objectives, organizing and presenting reports, introductions, reaching decisions, and summarizing.

2-355. Parliamentary Procedure

Spring, 2 credits

GEORGE E. BEAUCHAMP

Principles and practices of parliamentary procedure. Designed for persons who work with organizations which use these principles in the conduct of meetings.

FOREIGN LANGUAGES

The Graduate School provides opportunities for instruction in a wide range of foreign languages. The person who is seeking the maximum practical value from a foreign language must learn not only to translate it but to think in it well enough for translation to be unnecessary. It is the aim of those responsible for these courses to conduct them so as to develop in their students a ready and intelligent use of the language.

LINGUISTICS

2-375. Introduction to European Languages: Slavic Group

Year, 2 credits each semester

JACOB ORNSTEIN

A study of the European language families from a historical-cultural viewpoint. Consideration of the main features of the three leading European (Indo-European) language families, the Germanic, the Romance, and the Slavic. Detailed study of the Slavic group, including the Slavic (Syrillic) alphabet, rudiments of phonology and structure, basic vocabularies, reading of selected passages. Guided outside reading is arranged for each student in any of the Slavic languages in which he is interested.

Designed for persons who are not acquainted with foreign languages as well as for those who have had previous language study.

FRENCH

2-87. French for Travelers

Fall, non-credit. Repeated in Spring and Summer

GERMAINE BARGIN

Acquiring a facility in the use of oral French, including practical, every-day expressions helpful to those who plan a trip to France or to those who plan to work in a French-speaking country. For persons with or without previous study of the language.

2-253. Elementary French

Year, 3 credits each semester

GERMAINE BARGIN

MARGUERITE ETIENNE

Provides basic knowledge of French grammar and vocabulary. Reading, translation, dictation, and some conversation. For beginners.

2-254. Intermediate French

Year, 3 credits each semester

GERMAINE BARGIN

Systematic review of French grammar. Writing of French composition, reading, translation, dictation, conversation. For students who have had one year of college French, or two or three years of average grammatical preparation below college level.

2-255. French Conversation

Year, 2 credits each semester

MARGUERITE ETIENNE

Designed to develop in students a fluent style of idiomatic conversation on topics most likely to be met in travelling in French speaking countries. Grammar review only if deemed necessary. Some composition and dictation exercises. Reading of current French newspapers and magazines. *Prerequisite:* Two years of college French or the equivalent; a good knowledge of grammar and a sizeable vocabulary.

GERMAN**2-66. Reading German**

Fall, non-credit. Repeated in Spring and Summer

MARIANNE LEDERER

A course designed for those who need a reading knowledge of German in their work or in order to meet language requirements for an advanced degree. Vocabulary emphasis depends on needs of the students registered. No previous study of the language is required.

2-76. German Sight Reading

Fall, non-credit. Repeated in Spring

MARIANNE LEDERER

Short review emphasizing grammatical construction. Reading of newspapers and articles in different fields of science. Intended for persons who wish to increase their vocabulary and improve their reading knowledge. *Prerequisite:* Ability to translate texts.

2-88. German for Travelers

Fall, non-credit. Repeated in Spring

MAGNA E. BAUER

Accuracy and facility in the use of oral German through listening to spoken German, reading, word analysis, and particularly repetition of the "basic thousand words" in round-table conversation. Work will be adapted to the members of the class. The beginner will have a chance to acquire a working vocabulary; the more advanced student will have an opportunity to practice the correct use of words, phrases, and idiomatic expressions. For beginners in the language as well as those who have had one year or more of German.

2-259. Elementary German

Year, 3 credits each semester

MARIANNE LEDERER

Essentials of German grammar. Reading and writing simple prose. Introduction to extensive reading. Some conversation. Training in the fundamentals required to go on to Intermediate German.

[2-260.] Intermediate German (1956-57 and alternate years)

Year, 3 credits each semester

MARIANNE LEDERER

2-261. German Conversation

Year, 2 credits each semester

MAGNA E. BAUER

Development of facility in discussion and reading, use of idioms, writing and thinking in the language. *Prerequisite:* Two years of college German, or the equivalent.

ITALIAN

2-270. Elementary Italian

Year, 3 credits each semester

MAGNA E. BAUER

Essentials of Italian grammar. Reading and writing simple prose. Introduction to extensive reading, some conversation.

2-271. Intermediate Italian

Year, 3 credits each semester

S. BERNARD FINLAY

Grammar review. Extensive reading and vocabulary building to provide an adequate foundation for understanding Italian texts and carrying on conversation. *Prerequisite:* One year of college Italian, or two or three years of average grammatical preparation below the college level.

PORTUGUESE

[2-290.] Elementary Portuguese (1956-57 and alternate years)

Year, 3 credits each semester

JACOB ORNSTEIN

RUSSIAN

2-45. Review of Elementary Russian

Summer, non-credit

GEORGE M. SAHAROV

General review of Russian grammar, accompanied with oral and written exercises. *Prerequisite:* A year course in elementary Russian, or the equivalent as approved by instructor.

2-295. Elementary Russian

Year, 3 credits each semester

GEORGE M. KORENEV ROCKWELL
GEORGE M. SAHAROV
EUGENIA TARAKUS

Designed to give the student a sound foundation in basic Russian. Includes reading, writing, and speaking of Russian. Special attention is given to the fundamental rules of Russian grammar, Russian phonetics, and the mechanics of good reading and writing. The first semester covers the first 18 lessons of the textbook, "Bondar's Simplified Russian Method, Seventh Edition," and the second semester covers the second 18 lessons. Students should have a good knowledge of English grammar.

2-296. Intermediate Russian

Year, 3 credits each semester

GEORGE M. SAHAROV

Reading and translation, grammatical analysis, dictation and conversation in Russian. *Prerequisite:* One year of Russian which included the completion of a basic grammar text, Bondar or the equivalent.

2-297. Conversational Russian

Year, 3 credits each semester

GEORGE M. SAHAROV

This course is alternated with Advanced Russian, depending upon student demand. For students who have had at least two years of Russian language training.

2-299. Advanced Russian

Year, 3 credits each semester

GEORGE M. SAHAROV

Reading and translation of more advanced Russian texts, composition in Russian, oral and written translation from English to Russian. Conversation. *Prerequisite:* Two years of Russian.

SPANISH**2-89. Spanish for Travelers I**

Fall, non-credit. Repeated in Spring and Summer

ODILON PONCE

Acquiring a facility in the use of oral Spanish, including practical, every-day expressions helpful to those planning a trip to a Spanish-speaking country. For persons with and without previous study of the language.

2-90. Spanish for Travelers II

Fall, non-credit. Repeated in Spring and Summer

ODILON PONCE

Continuation of Spanish for Travelers I. For students who have had some Spanish conversation training or experience.

2-300. Elementary Spanish

Year, 3 credits each semester

ERWIN JAFFE

MARJORIE C. JOHNSTON

Foundation work in grammar, vocabulary, reading, and translation.

2-301. Intermediate Spanish

Year, 3 credits each semester

FERNANDO R. ROMERO

Grammar review, more difficult reading and translation, use of idioms, writing and discussion in the language. *Prerequisite:* One year of Spanish at college level, or two or three years below college level.

2-302. Spanish Composition and Conversation

Year, 2 credits each semester

G. MEDRANO DE SUPERVIA

Thorough training in the structure of the language, through reading and discussion of Spanish newspapers, magazines and novels of today. Writing of compositions, commercial and familiar letters; helping student acquire ability to speak and understand everyday and colloquial Spanish. *Prerequisite:* Intermediate Spanish or equivalent.

2-574. Advanced Spanish Conversation and Literature

Year, 2 credits each semester

RAFAEL SUPERVIA

Especially adapted for those having a fair knowledge of the Spanish language, who want to improve it by the readings of and comments on the masters of Spanish literature. *Prerequisite:* Ability to read, understand, and express oneself clearly in Spanish.

Mathematics and Statistics

DEPARTMENTAL COMMITTEE

B. R. STAUBER (Chairman)

JOSEPH F. DALY
HAROLD F. DORN

MARGARET J. HAGOOD
MORRIS H. HANSEN

EARL E. HOUSEMAN

THE STATISTICIAN AND HIS EDUCATION

Unprecedented dependence is being placed on statisticians by administrative officials in government and private business all over the world. The statistician, through his specialized training, is able to provide current and comprehensive information on many subjects, and to do so with speed and economy. His specialized techniques are indispensable in industry.

The making of a statistician is a long and exacting process—several years of graduate study, plus at least a year and a half of high-grade experience under competent leadership. Educational facilities are strained, not only because of the heavy and increasing demand but also because the educational requirements placed on the statistician today are of an entirely different order of magnitude than they were a few years ago.

The courses described on the following pages accordingly provide training not only in theoretical principles, but training also in the administrative and research uses of data, as well as in the collection and processing of data and in the development and supervision of the minor skills necessary for carrying out statistical work.

In the design of a survey the statistician is concerned with the reliability and the cost of the figures that are to be obtained. Reliability is affected by many sources of error, which can be classified under two groups: (a) biases that are common to both complete counts and samples; (b) sampling errors. A thorough understanding of both types of error is essential in the work of the statistician. The statistical courses listed on the following pages deal mainly but not entirely with sampling errors. Proficiency in one or another branch of subject-matter such as sociology, economics, agricultural science, engineering, or some other specialized field, is essential for a full appreciation of the first type of error and for that reason collateral studies in one or more fields of science are advised and in fact are insisted upon in work leading to a Certified Statement of Accomplishment in Statistics.

INTERNSHIPS IN SAMPLING

COMMITTEE

B. R. STAUBER (Chairman)

WILLIAM G. COCHRAN
MORRIS H. HANSEN
STERLING R. NEWELLS. MCKEE ROSEN
IRVING SIEGEL
FREDERICK F. STEPHAN

In recognition of the need for statisticians with thorough theoretical training and with experience in large-scale statistical projects under competent leadership, and in recognition of the exceptional facilities in Washington for specialized training in this field, the Graduate School has undertaken to present to qualified students the opportunity to pursue their studies under a system of internships. Under this program a limited number of qualified persons have a unique opportunity to combine advanced study with practical experience in sampling.

Internship Program

The internships provide opportunity for research work under leading authorities. The program is planned on an individual basis, depending on the experience, training and interests of the candidate. The internships are intended to supplement, not supplant, work offered in universities.

The following agencies have cooperated in the program:

Agricultural Marketing Service	Bureau of the Census
Bureau of the Budget	Bureau of Labor Statistics
National Bureau of Standards	National Institutes of Health
National Office of Vital Statistics	

The internship consists of two integrated parts:

- (1) classroom training in courses at the Graduate School or at other educational institutions in the city;
- (2) work experience in government agencies on large-scale statistical sampling and testing programs.

Length: Twelve or eighteen months; the length of time spent in the internship is determined by the training and experience of the applicant.

Qualifications: Doctorate (a) in mathematical statistics, or (b) in a field such as agriculture, business, economics, social psychology, engineering. By arrangement, an intern may combine his internship with work on a doctoral thesis.

Selection

Each application is reviewed and approved or rejected by the Committee on Internships in Sampling. The Committee helps the intern plan his program and consults with him from time to time concerning his progress. Where the intern program is being developed as a research project, serving as a basis for a doctoral dissertation, the Committee keeps the university informed of progress.

Stipends

The internships carry no stipends. The Graduate School makes and offers no living arrangements.

Fees

The only fees charged are nominal course fees for those courses in which the intern is registered.

Application

Address the application to the Director, Graduate School, Department of Agriculture, Washington 25, D. C., and include the following information:

- | | |
|---|---|
| (1) Name | (5) Fields of specific interest and |
| (2) Date and place of birth | circumstances surrounding |
| (3) Transcripts of previous academic work | application (i.e., purpose, whether applicant would devote full time to internship, etc.) |
| (4) Citations or copies of publications or technical papers | |

Applications should be submitted well in advance of the beginning of the fall semester in September to insure adequate arrangement of work schedules and course programs.

CERTIFIED STATEMENT OF ACCOMPLISHMENT IN STATISTICS

A Certified Statement of Accomplishment is offered in each of three fields of statistical study—fields representing areas of statistical preparation and application most useful in the public service. The required program in each field is outlined on page 32. The student who holds a bachelor's degree and who completes the basic courses and earns 24 credits in specialized courses listed in any column, with substitutions only as specifically approved, is eligible to receive a Certified Statement of Accomplishment. It certifies that the student has completed a program of study which, in conjunction with collateral training in a subject-matter field of application, prepares him for effective public service in a particular statistical field.

COURSES LEADING TO CERTIFIED STATEMENTS OF ACCOMPLISHMENT IN STATISTICS

(With Concentration in One of the Following Fields of Application)

THE SOCIAL SCIENCES

College Algebra, Plane Trigonometry, and
Analytic Geometry
Principles of Statistical Analysis

THE NATURAL SCIENCES

BASIC COURSES—Required of all candidates

College Algebra, Plane Trigonometry, and
Analytic Geometry
Principles of Statistical Analysis

MATHEMATICAL STATISTICS

College Algebra, Plane Trigonometry, and
Analytic Geometry
Calculus
Principles of Statistical Analysis

SPECIALIZED COURSES

3-206. Calculus
3-400. Introduction to Mathematical Statistics
3-415. Higher Algebra
3-435. Sampling in Social and Economic Surveys
or
3-735. Theory of Sample Surveys
3-710. Multivariate Analysis

3-400. Introduction to Mathematical Statistics
3-405. Introduction to Experimental Statistics
3-507. Engineering Statistics and Quality Control
3-571. Design, Philosophy, and Interpretation of Experiments
or
1-570. Design of Experiments in Biological Sciences

3-400. Introduction to Mathematical Statistics
3-415. Higher Algebra
3-500. Advanced Calculus
3-710. Multivariate Analysis
3-712. Theory of Functions of a Complex Variable
3-735. Theory of Sample Surveys
3-748. Introduction to Mathematical Analysis
3-751. Theory of Measure
3-752. Advanced Theory of Probability

ELECTIVE COURSES

3-500. Advanced Calculus
3-502. Differential Equations
3-532. Introduction to Linear Programming
3-533. Introduction to Operations Research

3-571. Design, Philosophy, and Interpretation of Experiments
3-712. Theory of Functions of a Complex Variable
3-748. Introduction to Mathematical Analysis
3-752. Advanced Theory of Probability

MATHEMATICS

3-1. Review of College Freshman Mathematics

Fall, non-credit

ROBERT S. TITCHEN

A review course at the level of freshman mathematics. Algebra, trigonometry, analytic geometry. A brief introduction to the methods of the differential calculus. Emphasis on applications to statistical problems. *Prerequisite:* One year of college mathematics.

3-2. Review of Calculus

Spring, non-credit

THOMAS L. SAATY

Variables, functions, limits, divided differences, derivatives, application of derivatives to geometry, engineering curve fitting and analysis. Transcendental functions, polar equations, differentials, mean value theorem, techniques of integration and engineering application. Series and expansion of functions. *Prerequisite:* Calculus.

3-102. College Algebra

Fall, 4 credits. Repeated in Spring and Summer

HOWARD EDELSON

Fundamental rules of algebra; exponents; logarithms; manipulations with proportions; identities and conditions; solution of equations; binomial theorem; numerical approximations. Uses of symbolic operators. Elementary determinants; solution of equations by the reciprocal matrix. Theory of equations; progression; series. Permutations and combinations. Graphical methods. Emphasis on applications to statistics and the physical sciences. *Prerequisite:* High school algebra and plane geometry.

3-103. Trigonometry and Analytic Geometry

Spring, 4 credits

HOWARD EDELSON

Basic definitions and uses of trigonometric functions; logarithmic solutions; radian measure; fundamental identities; oblique triangles; polar coordinates, inverse trigonometric functions; complex numbers and De Moivre's theorem; graphs of the functions and the inverse functions; introduction to spherical trigonometry.

Fundamental concepts and formulas; line, circle, parabola, ellipse, hyperbola; transformation of coordinates; polar coordinates; parametric equations; the second and higher degree equation in rectangular coordinates; graphic solution of equations; introduction to solid analytic geometry. *Prerequisite:* College algebra.

3-104. Trigonometry

Summer, 2 credits

RANDALL D. ESTEN

Basic definitions and uses of trigonometric functions; logarithmic solutions; radian measure; fundamental identities; oblique triangles; polar coordinates, inverse trigonometric functions; complex numbers and De Moivre's theorem; graphs of the functions and the inverse functions; introduction to spherical trigonometry. *Prerequisite:* College algebra.

3-206. Calculus

Year, 4 credits each semester

JOSEPH H. KUSNER

First semester: Variables, functions, limits, continuity, derivatives. Applications of the derivative to geometry and physics. Maxima and minima. Differentials. Mean value theorem. Simple integration and applications to geometry and physics. Radius and circle of curvature. Vectors.

Second semester: Standard integral forms. Special methods of integration. Approximate integration. Improper integrals. Indeterminate forms. Taylor's formula with remainder. Infinite series. Partial derivatives. Multiple integrals. *Prerequisite:* Algebra, trigonometry and analytic geometry.

3-415. Higher Algebra

Fall, 3 credits

RANDALL D. ESTEN

Permutations and combinations, elementary probability, binomial and multinomial theorems. Theory of equations. Matrices, linear independence, orthogonality, partitioned matrices, and determinants; quadratic forms, linear transformations, latent roots of a matrix and characteristic function; numerical evaluation of determinants and solution of equations. *Prerequisite:* College algebra, trigonometry, and analytic geometry.

[3-500.] Advanced Calculus (1956-57 and every third year)

Year, 2 credits each semester

H. H. GERMOND

3-502. Differential Equations

Year, 2 credits each semester (every third year) Instructor to be announced

Various types of ordinary differential equations. Solutions in series; the methods of Frobenius and others. Mechanical methods. Partial differential equations. Boundary problems. Fourier series and integrals; Legendre polynomials. Applications to conduction of heat and vibrating strings. Laplace's equation. Calculus will be reviewed as necessary. *Prerequisite:* Calculus.

3-509. Mathematics for Economists

Year, 2 credits each semester (alternate years)

RICHARD J. FOOTE

This course covers aspects of mathematics which are most useful to economists: algebra, geometry, differential and integral calculus, differential equations, and matrix algebra. At each stage, the mathematical methods described are used to solve problems based on economic theory or analysis. Part of the second semester is devoted to the basic mathematical and statistical theory underlying maximum likelihood methods for handling systems of simultaneous equations. *Prerequisite:* A course in principles of economics.

3-532. Introduction to Linear Programming

Spring, 3 credits

SAUL I. GASS

Covers the basic theoretical and computational aspects of linear programming. The formulation of many problems are analyzed and computational techniques discussed. Includes the following topics: the optimization of a linear function subject to linear constraints, the simplex computational procedure, the duality theorems, the transportation problem, the contract awards problem, problems in production scheduling, additional applications, the equivalence of a zero-sum two-person game to a linear programming problem, parametric linear programming, and recent developments. Depending on the background of the students, the basic concepts of matrices, vectors and vector spaces, convex sets, and linear inequalities are discussed.

3-533. Introduction to Operations Research

Fall, 3 credits

THOMAS L. SAATY

This course is designed to give the student perspective and technique for handling operational problems. Covers the basic mathematics useful in operations research, including probability and statistics, the optimum distribution of effort, queuing theory, game theory, the variational method, and information theory. Operations research projects are assigned. *Prerequisite:* College algebra, working knowledge of analytic geometry.

3-538. Methods of Applied Mathematics

Year, 3 credits each semester

THOMAS L. SAATY

The object of this course is to put at the disposal of the student mathematical techniques which have frequent application. From algebra, groups, matrices, equations, inequalities (linear programming and game theory) are discussed with applications. From analysis, differential equations (ordinary and partial), infinite series, general functions (convex and others), transcendental functions, and asymptotic phenomena. From topology, fixed point theorems and polyhedra with applications to differential equations and game theory. Probabilities and statistics survey. *Prerequisite:* Calculus.

3-712. Theory of Functions of a Complex Variable

Year, 2 credits each semester (every third year)

H. H. GERMOND

Algebra and geometry of the complex plane, derivatives, and the Cauchy-Riemann equations; conformal representation, theory of power series and properties of analytic functions; Cauchy's integral theorem; Riemann surfaces; contour integration and residues; La Place and Fourier transforms. *Prerequisite:* Calculus.

[3-748.] Introduction to Mathematical Analysis (1956-57 and every third year)

Fall, 3 credits

Instructor to be announced

3-751. Theory of Measure

Spring, 3 credits (every third year)

Instructor to be announced

Review of theory of function of a real variable. Point set theory. Riemann integration, Lebesgue measure. Lebesgue and Stieltjes integrals. Applications to the theory of probability. *Prerequisite:* A course in mathematical analysis.

[3-752.] Advanced Theory of Probability (1956-57 and every third year)

Year, 3 credits each semester

JULIUS LIEBLEIN

STATISTICS

3-126. Introductory Statistics

Year, 2 credits each semester. Repeated in Spring and Summer

C. M. PURVES

OTTO RAUCHSCHWALBE

The collection of data. The presentation of data in tables and charts. Different kinds of averages. Dispersion. Introduction to index numbers. Relations between two or more variables. Introduction to correlation theory, regression, and interpretation of samples. Practice in calculations. *Prerequisite:* High school algebra and geometry.

3-135. Elements of Statistical Drafting

Fall, 2 credits

NELSON P. GUIDRY

A practical course in drafting involving actual preparation of statistical maps and charts in class. Explanations of short cut methods of lettering technique and arrangement of component parts of illustrations. Complete illustrations will be prepared in ink ready for publication. The reduction, reproduction, and color application to statistical maps and charts will be explained. Students supply their own drafting tools.

3-136. Graphic Methods of Presenting Statistics

Spring, 2 credits

R. G. HAINSWORTH

Analysis of statistical data to determine what form is best for graphic presentation. Application of data to the many types of illustrations in several forms of the various classes. Rough pencil layout examples of time series charts, frequency diagrams, graphic correlation charts, pictorial symbol charts, cartograms and other illustrative examples will be prepared in class. Comparability and evaluation of individual charts and maps in a series will be analyzed. *Prerequisite:* An introductory course in statistics, Elements of Statistical Drafting, or experience approved by the instructor.

3-318. Machine Tabulation I

Fall, 2 credits. Repeated in Spring

MILTON KAUFMAN

Designed principally for statisticians, accountants, and operators of punch card tabulating equipment. The instruction covers the principles of operation, functions, applications, limitations, etc. of the various types of IBM equipment such as card punching and verifying machines (including types 24 and 26), sorters, alphabetic accounting machine (type 402), reproducing punches, and other auxiliary machines. *The course covers instruction in the basic wiring of the machines.* More than half the course is spent on the alphabetic accounting machine (type 402). Instruction also deals with the principal Remington Rand punch card tabulating equipment. The course is not intended to train personnel in the physical operation of the various machines.

3-319. Machine Tabulation II

Fall, 2 credits. Repeated in Spring

MILTON KAUFMAN

Designed principally for statisticians, accountants, operators, and supervisors of punch card tabulating equipment. The instruction covers the principles of operation and functions of the IBM accounting machines, type 407 and the collating machines, types 77 and 89. *The course covers instruction in the wiring of the machines including the solution of advanced wiring problems.* *Prerequisite:* Machine Tabulation I or knowledge of the basic wiring of tabulating equipment.

3-380. Principles of Statistical Analysis

Year, 3 credits each semester

B. RALPH STAUBER

The purpose of the course is to lay a thorough foundation of the basic concepts and principles of statistical analysis as a method of scientific investigation.

Specifically, the course includes statistical terminology; elementary probability; the binomial, Poisson, and normal distributions; statistical tests of significance; simple and multiple correlation; some theory of determinants with applications to correlation and the inverse matrix; introduction to analysis of variance; introduction to sampling; elementary principles of design and analysis of surveys and experiments; use of statistical tables such as Fisher, Yates, and others. *Prerequisite:* A working knowledge of college algebra, plane trigonometry, and analytic geometry; an elementary course in statistics is desirable.

3-400. Introduction to Mathematical Statistics

Year, 3 credits each semester (alternate years)

MAX HALPERIN

A foundation course. A broad introduction to modern mathematical statistics, as preparation for further work in mathematical statistics for an advanced degree, or for a certified statement of accomplishment. Estimation: bias, consistency, efficiency. Testing statistical hypotheses. Solution of problems. Powers of various statistical tests. Use of moment generating functions to solve distribution problems. Methods of solution when the underlying distribution is unknown. Design of experiments and of sample surveys. *Prerequisite:* Calculus and Principles of Statistical Analysis or equivalent.

3-405. Introduction to Experimental Statistics

Year, 2 credits each semester

WALTER A. HENDRICKS

A non-mathematical course in the analysis and interpretation of data from agricultural and biological experiments. Elementary probability relationships; binomial, Poisson, and normal frequency distributions; the concept of sampling error; tests of significance of differences between averages; the chi-square test as applied to differences between observed and expected frequencies; regression and correlation; and elementary discussions of analysis of variance and covariance. Numerical examples. *Prerequisite:* College training in agriculture or a biological science; familiarity with ordinary methods of tabulating experimental data, computation of averages and the preparation of graphs.

3-435. Sampling in Social and Economic Surveys

Fall, 3 credits

HAROLD NISSELSON

Non-mathematical survey of sampling theory and practice. Development of the basic ideas of statistical sampling, with applications in social and economic surveys. Unrestricted random, stratified, systematic, area and cluster sampling, and subsampling. Sample designs used in the United States and in foreign countries are discussed with respect to considerations of statistical efficiency, cost functions, and the administrative limitations imposed on the design. *Prerequisite:* A course in elementary statistics.

3-448. Population Statistics I: Basic Sources and Methods

Fall, 3 credits

JACOB S. SIEGEL

Basic sources of population data in the United States. Collection and processing of demographic data. Quality of data. The decennial census. Basic methods of measuring and analyzing population size, geographic distribution, composition (age, sex, race) and dynamics (natality, mortality, reproductivity, and migration). Basic demographic rates, including crude and adjusted rates. General methods (standardization, cohort analysis, and interpolation). Nature and use of life tables. Introduction to population estimates and forecasts. *Prerequisite:* An elementary course in statistics and one or more courses in the social sciences.

3-449. Population Statistics II: Intermediate Methods and Applications

Spring, 3 credits

JACOB S. SIEGEL

Continuation of Population Statistics I, with treatment of more advanced techniques and specialized topics. Marriage and divorce. Population composition (marital status, ethnic characteristics, educational status, economic characteristics, etc.). Family statistics. Advanced analysis of mortality, natality, reproductivity, and migration; measures based on life tables. Construction of life tables. Population estimates and projections, including specialized types (families, labor force, school enrollment). Analysis of population composition and dynamics in relation to other factors. Practical applications of methods in social and economic research, market research, and government planning. *Prerequisite:* Population Statistics I, or equivalent in training or experience.

3-480. Statistical Methods and Experimental Design

Spring, 12 credits

JAMES G. OSBORNE and AUSTIN A. HASEL

Application of statistical methods to research work in the Forest Service stressing the logic of experimentation and the techniques of design, analysis, and interpretation of experiments or surveys. Emphasis is placed on: testing hypotheses in forest research; distribution of sample statistics; tests of significance.

Registration limited to qualified research personnel of the Forest Service.

3-507. Engineering Statistics and Quality Control

Fall, 2 credits

WILLIAM R. PABST, JR.

For graduates or students of engineering and physical science, presenting a sound, comprehensive, and practical approach to a working knowledge of statistics. Preliminary emphasis on modern statistics used by Government and industry. Includes fundamental statistical measures, curve fitting, testing goodness of fit, control charts, acceptance sampling by variables and attributes, and elementary experimental design. Guest lecturers are invited to conduct many of the sessions. *Prerequisite:* Degree in engineering or physical Science, or consent of instructor.

[3-560.] Theory of Electronic Digital Computing Machines (1956-57 and alternate years)

Year, 2 credits each semester

EDWARD W. CANNON

3-565. Data Processing on Electronic Computers I

Fall, 2 credits

LANCELOT W. ARMSTRONG

Provides a basic understanding of the capabilities and limitations of large-scale, high-speed electronic digital computers in general. Description of equipment presently available. The instruction code cited is that of the Univac system. Covers the following: types of computing equipment; organization of an electronic data processing system; notation and information units; machine functions; the Univac instruction code; logical flow charts; basic computer coding; coding techniques for standard operations; use of auxiliary equipment.

3-566. Data Processing on Electronic Computers II

Spring, 2 credits

LANCELOT W. ARMSTRONG

A continuation of Data Processing on Electronic Computers I for those who are interested in obtaining a more detailed knowledge of the preparation of computer programs. Emphasis on sorting, file maintenance, use of reference tapes, testing programs, preparation of test material, use of breakpoints, service routines, preparation of operating instructions, minimum latency coding, and automatic coding.

3-571. Design, Philosophy, and Interpretation of Experiments

Year, 2 credits each semester (alternate years)

GLENN L. BURROWS

Basic philosophy of the experimental method. Characteristics of a good experiment. Experimental designs and the associated statistical techniques for analyzing data. Methods for improving the precision of experiments. The main emphasis is upon the assumptions and procedural requirements that permit sound statistical inference rather than upon mechanics of the analysis. A critical appraisal of the appropriateness of widely used design and analysis techniques, and treatment of some recently developed or not widely known techniques designed to handle special problems. Problems submitted by students are used wherever appropriate.

[3-710.] Multivariate Analysis (1956-57 and alternate years)

Year, 2 credits each semester

HARRY WEINGARTEN

3-735. Theory of Sample Surveys

Year, 2 credits each semester

JOSEPH STEINBERG

History of sampling in social surveys. The use of statistical control in improving the quality and efficiency of the estimates. Calculation of sampling errors. Random, stratified random, purposive, double and systematic sampling. Cost function, choice of sampling unit; size and type of sample necessary to attain a stated degree of precision, and the distinction between precision and accuracy. The theory of probability is developed as necessary. The contributions of Fisher, Neyman, Yates, Cochran, and others are studied. *Prerequisite:* Principles of Statistical Analysis and Calculus.

3-025. The Organization of Statistical Services within the Federal Government—Seminar

Fall, non-credit

WALTER F. RYAN

The Federal statistical system: its growth, organization, major characteristics, and functions. A series of four lecture-seminars meeting at 3:30 to 5:00 P.M. on October 5, October 19, November 2, and November 16. No registration is required; no fees are charged.

Office Techniques and Operations

DEPARTMENTAL COMMITTEE

HENRY A. DONOVAN (Chairman)

ROBERT H. FUCHS
WILLIAM S. HARRIS
ZELMA J. HICKS
MARK M. KIRKHAM

JOHN S. LUCAS
A. R. MILLER
WILLIAM L. MOORE (Vice-chairman)
EDMUND STEPHENS

The courses offered in this department are practical, how-to-do-it courses of interest chiefly to persons in grade GS-7 positions, or below, who are working with these procedures, or who hope to train themselves for such positions. They are helpful also to persons in positions requiring some familiarity with more than one of the procedures (e.g., supervisors and administrative assistants), and to persons at the higher levels of responsibility who wish to become acquainted with the details of the operations.

CERTIFIED STATEMENT OF ACCOMPLISHMENT IN ADMINISTRATIVE PROCEDURES

The program leading to a Certified Statement of Accomplishment in Administrative Procedures should be of special interest to:

1. Persons already employed in administrative work of the procedural type, emphasizing techniques and skills.
2. Employees who aspire to enter administrative work but who, because of lack of college education, find their opportunities in that field greatly limited.
3. Employees who wish to prepare to become administrative assistants or to head units concerned with administrative procedures.

Requirements

1. High school diploma or equivalent.
2. Sixteen semester hours of credit with grades of "C" or better in Graduate School courses, distributed as follows:
 - a. A course in American National Government.
 - b. A minimum of eight credits (in addition to *a* above) selected from courses above the 100 level in the Department of Office Techniques and Operations or the Department of Public Administration, or a combination of these. Courses in accounting may not be included, except Federal Accounting Procedure and Federal Government Accounting.

- c. The remaining credits may be selected from courses, not included above, in the Department of Office Techniques and Operations, excluding all shorthand courses.
- d. A course in elementary statistics may be included. It is not required. If it is included, three credits may be deducted from c above.

—O—

CLERICAL-ADMINISTRATIVE PROCEDURES

4-101. Everyday Mathematics

Fall, 2 credits. Repeated in Spring and Summer

RALPH R. BOTTS
C. M. MOUSER

Designed for clerical workers who are called upon to apply fundamentals of arithmetic to their jobs. Emphasis will be placed on review of business arithmetic including fractions, ratios, proportion, percentages, common divisors and multiples, progressions and elementary graphs and statistics. Special applications will be made to business problems such as simple interest; simple, bank, cash and trade discount; profit and loss; sales turnover; equation of partial payments and accounts; commuting debts; compound interest; compound discount; and annuities. Use of calculating machine will be explained.

4-108. Administrative Procedure

Fall, 2 credits. Repeated in Spring and Summer

THOMAS J. HICKEY

Intended for persons who wish to become supervisors or administrative assistants or who are now serving in such capacity in a small organizational unit. Deals with the aspects of the day to day assignments for which these persons ordinarily are responsible, such as preparation of budget data for small organizational units; the proper establishment of authority and responsibility and organization structure; fundamentals of personnel administration; essential requirements for good supervision.

The second part of this course deals with the introduction to administrative planning, administrative procedures and management generally at the lowest organization level, including work reporting and work measurements, work processes and work control reports; relation of these studies to the budgetary and personnel needs of the unit; and the theory of staff versus operating jurisdiction over administrative planning.

4-206. Office Management

Fall, 2 credits. Repeated in the Spring

GLENN D. WAGNER

Designed to give employees and supervisors a better understanding of the principles and methods of effective office management, and to increase their proficiency in their work. Deals with the practical day-to-day problems and questions encountered in managing an office such as organizing for effective operation, the planning and control of office work, paper-work management, utilization of office equipment and services, dealing with personnel and human relations problems, securing coordinated effort and teamwork, effecting improvements. *Prerequisite:* Administrative Procedure, or experience in administrative work.

4-110. Federal Auditing Procedure

Year, 2 credits each semester

EMMET B. COLLINS

Designed for persons who have no prior knowledge of auditing procedure or for those who wish to refresh or increase their knowledge in order to prepare themselves for more responsible positions. Covers the fundamentals of voucher

examination with case studies of Comptroller General decisions relating to fiscal documents and procedures. Includes explanations and discussions of Federal auditing policy and practice with detailed study of common types of Government vouchers and related documents and procedures. Specific areas covered are travel, transportation and storage, personal services, leave, retirement, bids, contracts and other aspects of procurement, claims, certifications and General Accounting Office regulations. Applicable Comptroller General decisions in these areas are studied.

4-112. Federal Accounting Procedure

Fall, 3 credits. Repeated in Spring and Summer

CHARLES I. JENKINS

Designed particularly to train accounting clerks through instruction of employees now working in lower grades and to assist accounting clerks in present and prospective positions. It embraces explanation of, discussion on, and practice work with the basic ledgers (allotment ledger, objective classification ledger, and general ledger) maintained in connection with funds made available to Federal agencies. Appropriation, apportionment, allotment, disbursement, collection, and reporting processes will be discussed and the relationship between administrative accounts and accounts kept by the Treasury Department and the General Accounting Office explained.

4-113. Federal Property Procedure

Spring, 2 credits

RALPH G. MCINTYRE

An intensive one-semester course covering laws, regulations, and principles dealing with control, utilization, and disposal of Federal personal property. Designed to furnish persons currently employed in this field an opportunity to study approved accountability and control systems, including management techniques, capitalization policies, general ledger controls, audit and inspection requirements, inventory controls, and accountability methods; utilization policies and procedures, including development and application of use, replacement, and preventive maintenance standards; management through inventory controls, surveys, and inspections; disposal policies and procedures, including transfers, donations, sales, abandonment, and destruction; statistical reporting of motor vehicles.

4-114. Federal Personnel Procedure

Fall, 2 credits. Repeated in Spring

VERNA C. MOHAGEN

Deals with the elementary principles and procedures of Federal personnel administration, including a study of the Federal personnel structure and organization, history and progress of the merit system, rules and regulations of the Civil Service Commission, and other basic procedural sources; use of personnel forms and records; Civil Service examinations and recruitment; appointments; transfers; promotions; separations and reductions in force; suspensions and disciplinary actions; retirement; performance ratings; leave and hours of duty; personnel reports, applications of Decisions of the Comptroller General, administrative policy statements, and administrative orders.

[4-214.] Advanced Federal Personnel Procedure (1956-57 and alternate years)

Fall, 2 credits. Repeated in Spring

EUGENE J. PETERSON

4-115. Federal Purchasing Procedure

Year, 2 credits each semester

TONY M. BALDAUF

For persons who are in purchasing work or who wish to enter the field. Covers the detailed requirements of laws, regulations, and procedures applicable to procurement from Federal sources of supply, and purchasing or contracting for supplies and services from commercial sources; the practical application of

such requirements through the preparation of procurement and related documents covering the more common types of transactions. The fall semester is devoted to those phases having general application to purchasing but more specifically to procurement from Federal sources of supply and purchasing not requiring the solicitation and acceptance of bids. The spring semester covers the basic laws, regulations, and procedures applicable to the simpler contracts arising from competitive bidding or negotiation.

4-116. Federal Budgetary Procedure

Fall, 2 credits. Repeated in Spring

JESSE B. MCWHORTER

This course is designed to assist employees either in budget work or preparatory to taking budget work, up to and including Grade GS-9. It deals with budgetary procedures, including the preparation of estimates, justifications, tabular statements, graphs, etc., and, in connection with budget execution, outlines methods in making allotments, preparation of apportionment and obligation reports, and other methods used in the formulation and execution of the Federal budget.

4-201. Supervision

Fall, 2 credits. Repeated in Spring and Summer

MARK M. KIRKHAM

A course for persons who have or expect to have first-line supervisory responsibilities. Particular emphasis will be placed upon the need for understanding human behavior and attitudes as they manifest themselves in group efforts. The dynamic setting in which supervisory responsibilities are discharged, its importance to management, the individual qualities and specific techniques employed by supervisors to improve work methods will be considered, and a program of self-development and self-evaluation in the art of supervision suggested.

PAPERWORK MANAGEMENT

4-117. Records Management Procedure

Fall, 2 credits

DOROTHY M. LUTTRELL and ROBERT H. LANDO

A course of instruction in how to process, maintain and service records, designed for students who desire to enter the records management field or who are interested in supplementing their knowledge of the mechanics and techniques of record operations. Includes detailed instructions in methods of (1) recording and controlling communications, (2) classifying, coding and indexing correspondence and other record material, (3) filing records and references, and (4) furnishing records reference service, including the establishment and operation of charge-out and follow-up systems. This course also provides study and discussion of (1) the theory and structure of the various systems of classification and filing, (2) the selection of the proper systems of classification for individual requirements, and (3) the development of individual classification and filing patterns.

4-217. Advanced Records Management

Spring, 2 credits

DOROTHY M. LUTTRELL and ROBERT H. LANDO

Designed to give the student a comprehensive knowledge of the management of Government records. Includes a detailed study of the requirements of the Federal Records Law and action necessary for meeting the requirements of this law; the application of management techniques to the creation, maintenance, utilization, preservation and disposition of records. Also includes a discussion of laws and regulations governing the preservation and disposal of records, appraisal, systematic retirement, storage, disposal and microphotography; the development and application of records retention and disposal standards. *Prerequisite:* Records Management Procedure or consent of instructor.

4-330. Government Letter Writing

Fall, 2 credits. Repeated in Spring and Summer

LUCILE N. BOYD
VERNE L. SAMSON

Intended for persons in administrative positions who are called upon to handle administrative problems through correspondence. The writing of clear, accurate, concise, courteous letters and memoranda. Principles of effective letter writing. Practice in criticizing and revising outgoing correspondence, and in planning and drafting replies to incoming letters. *Prerequisite:* A good foundation in English grammar, vocabulary, and composition, through courses or writing experience.

4-420. Procedure or Directive Systems

Fall, 2 credits

SAMUEL E. LANDIS

A study of the various systems for issuing directive-type material covering policies, procedures, and other official information. Special attention is given to the basic elements of a flexible directives system, and methods of originating directives, defining distribution, and improving reproduction processes. Technical functions such as codifying and indexing, and the development of standards for format and editing are included. The course provides a technical background for developing and evaluating various directives systems and to provide techniques for installing and operating effective systems.

4-421. Writing Procedures and Instructions

Spring, 2 credits

KAY PEARSON and ERNEST T. SPIEKERMAN

A course of instruction in how to develop and write manual issuances, circulars, office memoranda, and other forms of rules, regulations, instructions, and procedures. Special attention will be given to ways of improving readability of such material, the use of a clear, simple style of writing, proper format, and use of "ready-reference" aids. It will provide drill in the practical application of principles and theories of procedure to actual writing. The purpose of the course is to provide students with group experience in writing procedures and instructions and in applying editorial and format standards. *Prerequisite:* Procedure or Directive Systems, or one year of experience in writing procedures at Grade GS-5 or above.

4-422. Reports and Forms Management

Fall, 2 credits. Repeated in Spring

EDWARD J. LEWIS and WILLIAM B. RICE

Designed to provide students with a comprehensive knowledge of forms and reports management systems and how to operate them. A study of: various systems used for controlling forms and reports; different techniques used in Government for forms design and format; standards and printing specifications; methods for analyzing forms and reports; and how to install and operate forms and reports management programs. Analysis of forms and reports by case studies with group discussion of techniques involved. Special lectures by top technicians from representative Government departments.

4-424. Correspondence Management

Fall, 2 credits

ELLSWORTH D. SCHMITZ

A course designed to acquaint the student with ways and means of producing the highest quality of correspondence with the minimum expenditure of time and effort. Includes (1) the organization of a correspondence management program, (2) means of coordinating correspondence management activities, (3) techniques such as guide letters and form letters, (4) shortcuts such as the use of facsimiles and specialty envelopes, (5) "seven keys" to more efficient typing methods, and (6) improvement in letter writing.

SHORTHAND

These courses are designed to furnish Federal employees an opportunity to follow a program of training for stenographic careers in the Federal service. While each course represents a separate unit of study, with emphasis on material used in the Federal service, a proper sequence of courses insures a sound foundation for successfully qualifying for the various grades and classifications of stenographers in the Federal service.

"Review of Gregg (Anniversary)" will serve as rapid review for the student who has not applied his shorthand knowledge for a long time, or has used it so little that he feels uncertain about applying his knowledge to practical office dictation. Students wishing a review of Gregg Simplified should enroll in "Gregg, 60 to 80 Words."

"Gregg, 100 to 130 Words" is an intensive course on technical material. Students should have a sound foundation in theory and be able to write 100 words a minute with a 95 percent accurate transcript before registering for the course.

Home study is required in all the courses to attain goals set in course descriptions. Amount of study required varies according to the learning habits and individual goals of students.

A prerequisite for all shorthand courses is the ability to type-write with a fair degree of accuracy and speed.

Students who are planning to take the CPS (Certified Professional Secretary) examination will find, in addition to the courses in shorthand, the following courses of interest: Introduction to the Study of Human Relations, Supervision, Everyday Mathematics, Survey of Economics, and Business Law.

4-89. Review of Gregg Shorthand (Anniversary), 60-90 Words

Fall, non-credit. Repeated in Spring and Summer

FRANCES A. BUTLER
HARRIET E. STERN

A review of theory and brief forms. Reading from shorthand plates and students' own notes; dictation of standard material at various progressive rates of speed. *Prerequisite:* Completion of the Gregg Manual or its equivalent by the Anniversary system.

4-92. Shorthand Dictation Class, 70-90 Words

Fall, non-credit. Repeated in Spring and Summer

EDWARD J. ROBINSON

Dictation practice only, for students who do not need theory review, but wish to have sufficient regular dictation practice to permit them to attain a speed of 80 words. May be taken by users of any shorthand system. Gregg students who need theory review should take 4-89 or 4-225.

4-129. Gregg Shorthand Simplified I

Fall, 3 credits. Repeated in Spring and Summer

KATHRINE WILKEY GAASTERLAND
EVELYN J. ROBESON
EDITH WELTNER

Completion of the theory of Gregg Shorthand Simplified. Beginning dictation on new and practiced material.

4-130. Gregg Shorthand Simplified II

Fall, 3 credits. Repeated in Spring and Summer

MARGARET O. HOBBS
KATHRINE WILKEY GAASTERLAND
EDITH WELTNER

Increasing mastery of principles of Gregg Shorthand Simplified, by review and drill. Minimum dictation speed of 60 words a minute attained, with accurate transcripts, on new standard material. *Prerequisite:* Gregg Shorthand I or equivalent.

4-225. Gregg Shorthand Simplified, 60-80 Words

Fall, 3 credits. Repeated in Spring and Summer

E. DONALD BELL

Theory review. Minimum dictation speed of 80 words a minute attained. *Prerequisite:* Shorthand I and II or equivalent theory and dictation courses, and a minimum speed of 60 words a minute on new, standard material.

4-226. Gregg Shorthand, 80-100 Words

Fall, 3 credits. Repeated in Spring

EDRIE C. WAY

For those who have a minimum dictation speed of 80 words a minute using either the Simplified or Anniversary system, and who are able to produce accurate transcripts of letters and reports. Students who are weak on theory should take either 4-89 or 4-225 before enrolling in this course.

4-231. Gregg Shorthand, 100-130 Words

Fall, 3 credits. Repeated in Spring

EDITH WELTNER

For students who have a minimum dictation speed of 100 words a minute and who are able to produce accurate transcripts and reports. Review of theory. Speed-building.

Physical Sciences

DEPARTMENTAL COMMITTEE

HENRY STEVENS (Chairman)

MILDRED C. BENTON

ALBERT V. CARLIN

L. W. CURRIER

ELSA O. KEILES

ARNOLD J. LEHMAN (Vice-chairman)

JOSEPH B. LEVY

JOHN LYMAN

LOUIS C. PELTIER

MAURICE J. TERMAN

—O—

The courses in this department offer unusual opportunities for study under the guidance of scientists working in this field. The program will be of value to students who plan to enter these sciences; to those who desire to increase their knowledge of the science in which they now earn their living; and to those who wish, for cultural reasons, to learn more about these fields.

Most of the courses in this department are seminars designed to keep professional workers informed of recent developments in their fields and do not include laboratory work. A few of the courses offer basic training and, as indicated in the course descriptions, include laboratory work.

—O—

CHEMISTRY

5-65. Review of Elementary Organic Chemistry

Fall, non-credit

C. S. PRICKETT

General survey and review of material usually covered in first course in organic chemistry. Emphasis is on reaction chemistry and practice with synthetic methods based on important reactions. *Prerequisite:* Course in organic chemistry.

5-315. Elementary Biochemistry

Year, 2 credits each semester

SIDNEY M. HESS

The first semester's material will cover pH, oxidation-reduction, the chemistry of carbohydrates, fats, proteins, and the fundamentals of enzyme chemistry. The second semester will deal with the digestion and absorption of food, intermediary metabolism, excretion, vitamins, and hormones. Lectures, discussion, and examinations. *Prerequisite:* Organic chemistry.

5-349. Physical Chemistry

Year, 2 credits each semester (alternate years)

WILLIAM HORWITZ

Lecture course on the states of matter—gases, liquids, and solids; elementary thermodynamics, solutions, homogeneous and heterogeneous equilibria including the phase rule; ionic equilibria, conductance, electromotive force; chemical kinetics and colloids. *Prerequisite:* General chemistry, qualitative and quantitative analysis, physics, and calculus, or permission of the instructor.

5-400. Advanced Organic Chemistry

Spring, 3 credits

W. I. PATTERSON and LEE S. HARROW

Emphasis on synthetic organic chemistry and determination structure. Discussion of reliable preparative procedures, including their scope and limitations. Brief review of classes of organic compounds, including an introduction to the chemical literature and nomenclature associated with the field. *Prerequisite:* Organic chemistry.

5-522. Advanced Biochemistry

Year, 2 credits each semester (alternate years)

SIDNEY M. HESS

A detailed study of behavior and properties of vitamins, hormones and enzymes; the nature of biological catalysis; hydrolytic, phosphorolytic, and oxidizing enzymes; intermediary metabolism of amino acids, carbohydrates, and fats; and related subjects. *Prerequisite:* Elementary biochemistry or consent of the instructor.

5-540. Introduction to Chemical Kinetics

Fall, 2 credits (alternate years)

JOSEPH B. LEVY

A simple and balanced account of the general principles of chemical kinetics and its experimental application. The theories of reaction rates examined in a non-mathematical fashion for gas phase and solution reactions. The application of kinetics to the study of the mechanisms of various chemical reactions. *Prerequisite:* A course in physical chemistry.

[5-541.] Theoretical Organic Chemistry (1956-57 and alternate years)

Spring, 2 credits

JOSEPH B. LEVY

[5-542.] Physical Organic Chemistry (1956-57 and alternate years)

Fall, 2 credits

JOSEPH B. LEVY

[5-545.] Alkaloids, Glucosides, and Toxins of Biological Importance (1956-57 and alternate years)

Spring, 2 credits

GEOFFREY WOODARD and SPECIALISTS

5-550. Pharmacology and Toxicology of Insecticides

Spring, 2 credits (alternate years)

BERNARD DAVIDOW

Insecticides, rodenticides, fungicides, and insect repellents discussed with regard to identity, acute, chronic, and dermal toxicities, biochemistry, pharmacodynamics, and pathology. *Prerequisite:* Bachelor's degree or equivalent in biology or chemistry; knowledge of physiology desirable.

5-620. Advanced Inorganic Chemistry

Spring, 3 credits

C. S. PRICKETT

The chemistry of the less familiar elements as well as such special subjects as complex ion formation, stereoisomerism of inorganic substances, etc., interpretation of chemical properties in terms of atomic structure. *Prerequisite:* Qualitative analysis, and physical chemistry or college physics.

5-625. Specialized Analytical Techniques

Fall, 2 credits

GEOFFREY WOODARD and STAFF

A detailed discussion of some of the physical methods used in analytical work for determination, separation, or identification, particularly of organic compounds. Among the methods covered are ultraviolet, visible, and infrared spectrophotometry, partition, adsorption, and paper chromatography, and counter current distribution. Emphasis is placed on practical applications. Laboratory demonstrations are included where possible.

GEOGRAPHY AND GEOLOGY

Students who are studying or working in the field of geography or geology may be interested, in addition to the courses listed here, in courses in Soil Sciences, Meteorology, and Surveying and Mapping.

*Geography***[5-114.] Maps and Charts (1956-57 and alternate years)**

Fall, 2 credits

CATHERINE I. BAHN

5-420. Geography of the Eastern United States

Fall, 2 credits

VINCENT M. THROOP

Geographic regions of the United States east of the hundredth meridian in relation to the basic principles of geography. The physical setting and organization of activities in each region. Techniques of analysis are introduced and applied as they relate to current problems. Special emphasis is given to urban areas.

5-421. Geography of Western United States

Spring, 2 credits

VINCENT M. THROOP

The geographic regions west of the hundredth meridian, from the viewpoint of the geographic principles involved. Practice in the application of regional analysis is developed through the study of current problems. Land and water utilization receive special emphasis.

5-561. Geography of World Agriculture

Fall, 2 credits

CLAYTON E. WHIPPLE and ASSOCIATES

The influence of climate, soil, topography, and density and distribution of population on world agriculture. The problems encountered in collecting and analyzing statistics on world production, trade, and consumption of principal crop and livestock products. How countries of strategic importance have adapted their agriculture to climatic and economic conditions.

5-563. Geography of American Agriculture

Spring, 2 credits

CARLETON P. BARNES

A study of the character, trends, and problems of American agriculture in their diverse regional manifestations. Physical background of climate and soil in terms of the regional potentialities they afford and the limitations they set; types of farming and the reason for their distribution; recent regional shifts and

their explanation; potentialities for increased production nationally and regionally; regional aspects of soil conservation; regional differences in scale of farm operations and farm family living; regional competition and regional dependency.

Geology

5-203. General Geology

Fall, 3 credits

MAURICE J. TERMAN

Minerals and rocks as constituents of the earth's crust; processes of weathering, erosion and deposition; vulcanism; structures of sedimentary and igneous rock formations; diastrophism; mountain building; land forms and their relation to various geologic processes; stability of the earth's crust. The course includes classroom exercises in the study of common minerals and rocks, and interpretation of topographic and geologic maps. *Prerequisite:* Inorganic chemistry is desirable.

5-205. Practical Geology

Spring, 3 credits

MAURICE J. TERMAN

A non-professional course describing the practical uses and economic aspects of geology. General background of historical and regional geology; brief analysis and comparison of exploratory methods; summaries of origins, occurrences, and distribution of ground water, petroleum, non-metallic and metallic mineral deposits; and a survey of the applications of geology to civil engineering. Assignments are made to familiarize the student with the utilization of geologic methods in each of these fields. *Prerequisite:* A knowledge of elementary physical geology or some familiarity with minerals and rocks is desired.

5-455. Elementary Photogeology

Fall, 3 credits. Repeated in Spring

RICHARD G. RAY

Designed to familiarize the student with the following: geometry of the aerial photograph; stereoscopes used in the study of aerial photographs; recognition criteria of geologic data; principles and use of simple photogrammetric instruments for measuring geologic data, compiling simple base maps, and transferring geologic data from photographs. Lectures supplemented by laboratory demonstration and practice in use of measuring and plotting instruments. About one-third of the class time is devoted to interpreting geology and compiling geologic maps from aerial photographs of a specified area. *Prerequisite:* A course in geology or equivalent experience.

5-635. Principles of Ground-Water Geology and Hydrology

Fall, 3 credits

GARALD G. PARKER and ASSOCIATES

Basic principles of the science of ground-water geology and hydrology. Conservation and ground-water law. Solving of practical ground-water problems.

[5-707.] Metamorphic Petrology and Petrography (1956-57 and alternate years)

Fall, 3 credits

ROBERT B. FORBES

SOIL SCIENCES

[5-405.] Soils—Their Origin and Geography (1956-57 and alternate years)

Spring, 3 credits

CONSTANTIN C. NIKIFOROFF

5-531. Soils: Their Morphology, Genesis, and Classification

Spring, 3 credits (alternate years)

CONSTANTIN C. NIKIFOROFF

The nature of soils and the broad principles governing their behavior are first discussed, followed by consideration of soil morphology, formation, and classification. Particular attention is given to characteristics of the great soil groups and their genesis in relationship to the physical and biological forces of the environment. Soil geography of the United States is dealt with broadly, but some examples from other parts of the world are used. Throughout the course, relationships of soil characteristics to agricultural development, soil use and conservation, and patterns of human occupancy are emphasized. *Prerequisite:* Freshman chemistry or its equivalent. Previous training in soils, plant physiology, geography or geology is desirable.

METEOROLOGY

The following courses in meteorology are offered in cooperation with the United States Weather Bureau. The courses may be taken singly, or as a program leading to a certificate of accomplishment. Registration in these courses is not limited to employees of the Weather Bureau.

CERTIFIED STATEMENTS OF ACCOMPLISHMENT IN METEOROLOGY

Two Certified Statements of Accomplishment are offered in meteorology. The required programs, with the suggested chronological order of courses, are outlined below. The First Certified Statement of Accomplishment in Meteorology may be awarded to the student who satisfactorily completes the required courses totaling 19 credits. The Second Certified Statement of Accomplishment in Meteorology may be awarded to the student who completes the courses totalling 34 credits. The courses may be taken at a faster rate than the one suggested in the program, with special permission of the Departmental Committee.

The required courses, Calculus and Physics for Meteorology, are considered to be the absolute minimum in mathematics and physics. A more complete preparation, and the one recommended to the person who wishes to make of meteorology his professional career, will require courses also in differential equations and vector analysis, plus at least a one-year course in college physics, with laboratory. Courses in chemistry and statistics would be valuable, but not essential.

COURSES LEADING TO CERTIFIED STATEMENT OF ACCOMPLISHMENT IN METEOROLOGY

First Statement—Elementary

Required Prerequisite Courses. May not be used to meet the credit hour requirement for the certified statement. Equivalent courses will be accepted by transcript from other institutions.

The number in parenthesis after the course title indicates semester hour credits.

Calculus (8)

Physics for Meteorology (3) or a year course in college physics

Required Meteorology Courses.

First Year

General Meteorology (3)

Synoptic Meteorology (6)

Second Year

Introduction to Dynamic Meteorology (6)

Weather Analysis and Forecasting (4)

Second Statement—Advanced

Courses required for the first statement plus the following:

Third and Fourth Years

Advanced Weather Analysis and Forecasting (6)

Electives (9 credits) selected from the following courses:

Hydrology

Statistical Methods in Climatology

Elements of Fluid Mechanics

Applied Climatology

Physical Meteorology

Elements of Dynamic and Synoptic Climatology

Selected Topics in Meteorology

Oceanography

—O—

[5-162.] **Principles of Meteorology** (1956-57 and alternate years)

Fall, 2 credits

ALBERT V. CARLIN

5-212. Physics for Meteorology

Fall, 3 credits

HERMAN NEWSTEIN

Professional meteorology courses require a knowledge of physics as a prerequisite. This is a one-semester course which will fulfill the prerequisite requirement for all the U. S. D. A. meteorology courses. Subject matter to be covered will include topics in college physics with particular emphasis on their application to meteorological problems. Subject matter may be varied to meet the needs of the class. *Prerequisite:* Algebra and trigonometry.

5-310. Statistical Methods in Climatology

Fall, 2 credits

H. C. S. THOM

A study of modern climatological methods with emphasis on statistical analysis as applied to meteorological data. Elementary concepts of probability are discussed with application to discrete and continuous climatological series. The basis for climatological prediction is developed together with fundamental principles of the application of meteorology to technology. The distributions of the simple climatological elements are discussed and applications made to meteorological data. Simple regression and analysis of variance theory are developed

for use in applied meteorological problems. Confidence interval theory and tests of significance are emphasized throughout the course. *Prerequisite:* A knowledge of elementary meteorology.

5-326. General Meteorology

Spring, 3 credits

SIGMUND FRITZ

A one-semester course in the fundamentals of the physical aspects of modern meteorology for the professionally interested student. Atmospheric composition and structure and their measurements; solar and terrestrial radiation, radiation laws; gas laws; adiabatic, pseudoadiabatic, and non-adiabatic processes; fronts; thunderstorms; fog; wind. *Prerequisite:* High school algebra and trigonometry.

5-415. Applied Climatology

Fall, 3 credits

WOODROW C. JACOBS

The application of well known climatological methods toward solving specific weather problems of business, industry, air and surface transportation, and agriculture. Emphasis is placed on application of climatological methods in the solution of applied problems. The case method of class presentation is employed throughout the course. *Prerequisite:* A knowledge of the basic principles of meteorology. Course 5-310 and/or a knowledge of elementary statistics is helpful but not required.

5-533. Hydrology

Year, 3 credits each semester

MAX A. KOHLER

A two-semester course in basic and applied hydrology at the professional level. The first semester will be largely descriptive, covering such topics as elementary hydraulics; measurement and interpretation of streamflow, precipitation and other basic data; the hydrologic cycle; physics of soil moisture; the infiltration theory; wave travel and the unit hydrograph. The second semester will cover the development and application of procedures for applying basic hydrology to practical problems of river forecasting and design of water control works including such subjects as streamflow routing, flood frequency, the rational method of estimating flood magnitude, hydrometeorology, forecasting of runoff, influence of water control structures on streamflow, and problems of water control operation. *Prerequisite:* Physics and algebra; elementary meteorology, statistics, and engineering desirable.

5-534. Introduction to Dynamic Meteorology

Year, 3 credits each semester

MORRIS TEPPER

Designed to illustrate the use of higher mathematics and physics in the interpretation of meteorological phenomena, and in the development of forecasting techniques. *Prerequisite:* Calculus, or consent of the instructor.

5-535. Elements of Fluid Mechanics

Year, 3 credits each semester

MORRIS TEPPER

A basic one year course in the foundation of fluid mechanics aimed at giving the student a physical feeling for the more important concepts and relationships involved in problems concerning the flow of fluids. Topics will include: Flow models, basic concepts such as density, pressure, vorticity, viscosity, capillarity, etc., conservation laws, Bernoulli's equation, dimensional reasoning, characteristic parameters such as Froude number, Reynolds number and Mach number, potential flow, surface waves, elements of viscous flow and an introduction to compressible flows. *Prerequisite:* College physics and mathematics through differential and integral calculus.

5-536. Synoptic Meteorology

Year, 3 credits each semester

JAY S. WINSTON

A two-semester course in the fundamentals of modern synoptic meteorology for the professionally interested student. First semester: Air motion in the atmosphere, the general circulation, air masses, fronts, cyclones and anticyclones. Second semester: Distribution of precipitation, fog, etc., geographically and with respect to fronts and pressure centers, features of the upper levels, prognostication of sea-level and upper-air charts, forecasting weather. *Prerequisite:* Physics for Meteorology or college physics, and calculus; or consent of instructor.

[5-537.] Physical Meteorology (1956-57 and alternate years)

Fall, 3 credits

SIGMUND FRITZ

5-538. Weather Analysis and Forecasting

Year, 2 credits each semester (alternate years)

THOMAS I. GRAY, JR., and JAY S. WINSTON

A laboratory course in which concepts of air masses, fronts, and mid-tropospheric flow patterns are applied to analysis and prognosis of sea level and upper air weather charts for North American and adjacent areas. Short range forecasts of various weather elements are prepared for local and regional areas of the United States. *Prerequisite:* Synoptic Meteorology or equivalent.

[5-539.] Elements of Dynamic and Synoptic Climatology (1956-57 and alternate years)

Spring, 2 credits

WOODROW C. JACOBS

[5-580.] Advanced Weather Analysis and Forecasting (1956-57 and alternate years)

Year, 3 credits each semester

THOMAS I. GRAY, JR., and JAY S. WINSTON

5-589. Tropical Meteorology

Spring, 3 credits

LESTER F. HUBERT

Survey of major features of tropical climatology and oceanography. Convection. Dynamics and kinematics of the tropics. Synoptic models. Hurricanes and typhoons. Forecasting, including hurricane path computation. Includes map analysis and laboratory work, in which streamline-isotach analysis is emphasized.

[5-705.] Selected Topics in Meteorology (Not offered in 1955-56)

Year, 3 credits each semester

JAY S. WINSTON and OTHERS

OCEANOGRAPHY**5-360. General Oceanography**

Fall, 3 credits

RICHARD C. VETTER

A descriptive lecture course covering the characteristics of the oceans and the factors that control the distribution of properties and of plants and animals. Includes the physics, chemistry, geology and biology of the oceans. *Prerequisite:* College courses in at least two of the physical or biological sciences.

CERTIFIED STATEMENT OF ACCOMPLISHMENT IN OCEANOGRAPHY

A program leading toward a Certified Statement of Accomplishment in Oceanography has been established in cooperation with the U. S. Navy Hydrographic Office. The courses are taught in Suitland, Maryland, and are open to anyone who can meet the designated prerequisites.

The requirements for the certified statement are twenty hours of credit distributed as follows:

- (1) Physical Properties of Sea Water (given as General Oceanography in the spring semester, 1954) and Mathematics for Oceanographers, or equivalents of these courses. This requirement may be met by prior work at institutions other than the Department of Agriculture Graduate School. Students who wish to transfer credit to meet this requirement should present to the Graduate School a transcript of this previous work.
- (2) At least ten hours of credit selected from the following courses:
 - Practical Electronics for Oceanographers (2)
 - Ocean Surface Waves (2)
 - Geological Oceanography (2)
 - Biological Oceanography (2)
 - Dynamic Oceanography (2)
 - Marine Meteorology (2)
- (3) The remaining six hours of credit may be selected from courses offered by the Graduate School in fields related to oceanography, such as chemistry, physics, geology, geography, mathematics, engineering, meteorology, and biology. These electives should be selected by the student in consultation with the Registrar.

—O—

[5-582.] **Mathematics for Oceanographers** (1956-57 and alternate years)

Fall, 2 credits

A. L. BROWN

5-584. Physical Properties of Sea Water

Spring, 2 credits (alternate years)

A. WAYNE MAGNITZKY

A detailed examination of the physical principles governing the properties of sea water; a comparison of these properties with those of pure water; the definition and calculation of salinity and density; distribution of salinity, temperature, and density. *Prerequisite:* Permission of the instructor.

[5-585.] **Practical Electronics for Oceanographers** (1956-57 and alternate years)

Spring, 2 credits

Instructor to be announced

[5-655.] **Ocean Surface Waves** (1956-57 and alternate years)

Spring, 2 credits

J. J. SCHULE, JR.

[5-658.] **Geological Oceanography** (1956-57 and alternate years)

Fall, 2 credits

C. C. BATES

5-662. Marine Meteorology

Fall, 2 credits (alternate years)

M. D. BURKHART

An introduction to the fundamental principles of marine meteorology with special emphasis upon the problems of the marine climatologist and the physical oceanographer. Topics include: descriptive and synoptic meteorology; air mass analysis; boundary processes; radiation; and climatic principles. *Prerequisite:* Professional knowledge of meteorology or oceanography.

5-664. Dynamic Oceanography

Fall, 2 credits (alternate years)

J. J. SCHULE, JR.

A short exposition of the principles of vector analysis precedes the main course topics. These include the development of the principles of conservation of mass and momentum; the vector equations of motion; the hydrostatic equations and the density-pressure-depth relationship; the various current equations; the principles of turbulence; the equation of mean motion; and various approaches to the problem of evaluating the eddy stress terms. *Prerequisite:* Physical Properties of Sea Water (given as General Oceanography in the spring semester, 1954), and Mathematics for Oceanographers or its equivalent.

5-666. Biological Oceanography

Spring, 2 credits (alternate years)

Instructor to be announced

Identification and descriptive analysis of the more important flora and fauna; detailed examination of the physico-chemical principles of the nutrient and carbon-dioxide systems; distribution of flora and fauna. *Prerequisite:* Professional knowledge of oceanography or biology.

Public Administration

DEPARTMENTAL COMMITTEE

JOHN H. THURSTON (Chairman)

GLADYS L. BAKER

JAMES L. BUCKLEY

K. A. BUTLER

JOHN C. COOPER

PATTERSON FRENCH (Vice-chairman)

G. E. HILBERT

JOHN B. HOLDEN

MARTIN KRIESBERG

JOSEPH P. LOFTUS

WILLIAM A. MINOR

ROSS POLLOCK

ASHLEY SELLERS

JOHN L. WELLS

The importance of public administration in the modern state is apparent. The management problems of government now require personnel with more and better training in public administration. This is true particularly in regard to the junior and assistant positions.

Many of the ablest and most experienced public administrators in the United States are in Washington. Utilizing this unexcelled talent, the Graduate School offers courses to meet the needs of the Federal service in this field.

CERTIFIED STATEMENTS OF ACCOMPLISHMENT IN PUBLIC ADMINISTRATION

COMMITTEE

GLADYS L. BAKER (Chairman)

PATTERSON FRENCH

JOHN H. THURSTON

Certified Statements of Accomplishment are granted to undergraduate and to graduate students who have completed an organized course of study in public administration intended to provide basic training for responsible administrative work.

The programs leading to a Certified Statement of Accomplishment in Public Administration should be of special interest to:

1. Persons already employed in responsible administrative positions. Included in this group are many with specialized training who have been transferred to administrative positions from professional positions without training or previous experience in administration.
2. Junior Management Assistants. Those who entered the service with a management option may profit from courses both more advanced and more specialized than those taken in college. Those who entered on various professional options and are now employed in such professions can profit very greatly

from these courses if they expect, or wish to prepare, to enter into administrative work connected with their professional fields.

3. Employees who wish to broaden their understanding and improve their efficiency through a "tour of duty" by study, in lieu of an actual tour of duty for which they have found no opportunity.
4. Employees with college background who aspire to transfer to a career in administrative management.
5. Administrative assistants and administrative technicians of all kinds.

Requirements—Undergraduate Study

Students seeking this statement should consult with the Registrar and obtain approval of their proposed course of study early in their academic program.

1. High school diploma or equivalent. Applicants for the certificate must file a transcript of their high school or college work, before completion of their certificate program.
2. Twenty-four semester hours of credit with grades of "C" or better in college level courses in the social sciences.

Much importance is attached to general background courses in the belief that they help to broaden the thinking and understanding of the student so that he will possess a wider range of ideas and interests and sounder judgment of social values than would otherwise be the case and, in consequence, will be able to render Government service of a higher level of value. For this reason, these requirements will not be waived.

With the approval of the Registrar of the Graduate School, credit may be given for not more than six hours of other courses which are considered to be of value in connection with work in public administration (such as English literature, composition, philosophy, mathematics, or natural sciences). Introductory courses in the following must be taken:

American or European Government or Political Science
Economics
American or European History
Public Administration

3. Twenty-four semester hours of credit with grades of "C" or better in undergraduate and graduate courses in public administration, excluding all accounting courses except Federal Government Accounting. The 24 credit hours are to be distributed as follows:
 - a. A minimum of nine credits from the Division of Organization and Management.
 - b. The remaining fifteen credits may be selected from the Divisions of General Administration, Financial and Budgetary Administration, Personnel Administration, Legal Administration, Procurement and Property Management, or additional courses in the Division of Organization and Management. Students are advised to include in their programs at least one course from each Division.
 - c. Upon prior approval by the Registrar, credit for courses outside the Department of Public Administration (including not more than two courses in office techniques and operations) may be applied when such courses are properly in line with the student's major interest.
 - d. When a student has completed the social science requirements and fifteen hours in public administration courses, he should review his course of study with the Registrar.

Requirements—Graduate Study

Students seeking this statement should consult with the Registrar and obtain approval of their proposed course of study early in their academic program.

1. Bachelor's degree. This requirement will be waived only in very exceptional cases when the student can offer educational accomplishments substantially equivalent to a Bachelor's degree and when he has demonstrated by appropriate examination the breadth of knowledge equivalent to such a degree in the social sciences.
2. Twenty-seven semester hours of credit with grades of "B" or better in advanced undergraduate and graduate courses in public administration, of which twelve hours of credit shall be for courses numbered 500 and above, and excluding all accounting courses except Federal Government Accounting. The 27 credit hours are to be distributed as follows:
 - a. A minimum of nine credits from courses in the Division of Organization and Management.

- b. Fifteen credits selected from the Divisions of General Administration, Financial and Budgetary Administration, Personnel Administration, Legal Administration, Procurement and Property Management, or additional courses in the Division of Organization and Management. Students are advised to include in their programs at least one course from each Division.
- c. Three hours of credit for the course, Readings and Papers in Public Administration.
- d. Upon prior approval by the Registrar, credit for courses outside the Department of Public Administration may be applied when such courses are properly in line with the student's major interest.
- e. When a student has completed fifteen hours in public administration courses, he should notify the Registrar so that he may be assigned to an adviser.

CERTIFIED STATEMENT OF ACCOMPLISHMENT WITH HONORS

Students who complete the course requirements for the certified statement of accomplishment in public administration, undergraduate or graduate study, with an average of "B" or higher are given an opportunity to qualify for honors by passing an oral examination. The examination is given by a panel set up by the Graduate School. Students who wish to take the examination should apply to the Registrar at the completion of their programs.

GENERAL ADMINISTRATION

COMMITTEE

MARTIN KRIESBERG (Chairman)

GLADYS L. BAKER

O. B. CONAWAY, JR.

These courses offer a general understanding of American government and the fundamentals of public administration. In them a special emphasis is placed on the relationships of citizens and public employees.

A student who plans to take work in any of the divisions of the department will find that the specialized courses are more meaningful and useful if he has first completed the basic courses in this Division.

6-341. American National Government

Fall, 2 credits. Repeated in Spring

MARTIN KRIESBERG

History and origins of the national Government of the United States; the political process—parties and elections; the legislative process; the functions of the national Government and their administration; courts and judicial review of legislation. Students are advised to take this course before Introduction to Public Administration.

6-344. Introduction to Public Administration

Fall, 3 credits. Repeated in Spring

LYNN W. ELEY

This course is designed to introduce the student to the elements of public administration. Attention will be devoted to the evolution of administrative organization; organizational types: staff, line, and auxiliary agencies and functions; controls of administration; the broadest aspects of personnel selection, classification, training, movement, and relations; budgeting and fiscal control; federal-state relations; administrative legislation and adjudication. The object of the course is to lay a broad foundation for more intensive courses in management. *Prerequisite:* A course in American National Government.

[6-400.] Administrative Operations for Congressional Assistants (1956-57 and alternate years)

Spring, 2 credits

JEROME N. ELLER

6-600. Readings and Papers in Public Administration

Fall, 3 credits. Repeated in Spring

JOHN H. THURSTON, Coordinator

Under the guidance of a senior administrative official, supervised readings with monthly conferences on specified topics of administration or individual research and a paper on some problem or phase of administration. Readings or problem to be investigated are determined in consultation with adviser. *Prerequisite:* Completion of all other requirements for the undergraduate or graduate certified statement of accomplishment in public administration. The course may be taken, with the approval of the coordinator of the course, by students who are not candidates for certified statements if they have the equivalent background in public administration.

ORGANIZATION AND MANAGEMENT**COMMITTEE**

JOSEPH P. LOFTUS (Chairman)

N. ROBERT BEAR
HARVEY E. BECKNELL
WILLIAM A. GILL
EDWARD W. HARDING

MARK M. KIRKHAM
ARTHUR JEBENS
HAROLD A. STONE
BEN M. WILLIAMS

These courses are offered to give students an opportunity for progressive study and advancement in the general field of organization and management. The courses use to advantage, among other background data, the instructional and case materials developed by the Bureau of the Budget and by other Governmental agencies.

6-405. Principles and Techniques of O & M Work

Year, 2 credits each semester

RICHARD F. COOK

Deals with the principles and techniques employed in surveying and analyzing organization and methods problems and in formulating solutions to such problems. Emphasis on planning and conducting procedures surveys; methods and approaches in analyzing and planning organization structures including analysis of the impact of individual and group behavior on formal organization structures and authority; methods of dividing work (production planning) and

controlling work flow (production control); relationship of the scientific method to O and M work; analysis of staff and line concepts and relationships including the problem of overcoming resistance to new methods and procedures. *Prerequisite:* Experience in O&M work.

6-450. Principles and Applications of Scientific Management in Public Enterprise

Fall, 3 credits

JOSEPH P. LOFTUS

Common functional elements of management. Definition of objective; organization; planning; coordination of execution through schedules, budgets, reports, and measurement of progress. Types of motivation. Historic management types. Types of organization. Personal relations and community relations in the several management types. Origin, nature and development of scientific management. Application of scientific management in enterprises inside and outside of government. *Prerequisite:* Bachelor's degree; or a course in American government or public administration and a course in social science.

6-453. Human Relations in Administration

Fall, 3 credits

E. GRANT YOUMANS

Designed to develop the student's understanding of and competence in interpersonal relationships in large-scale organizations. Includes: value orientations in administration; formal and informal social systems; pathological social organization; status and role in administration; power and authority; leadership and the group; the authoritarian and democratic leader; psychological stress in administration; role-playing, motivation, and morale.

6-519. Work Standards and Work Measurement

Fall, 2 credits. Repeated in Spring

ECKHARD BENNEWITZ and BEN POSNER

WILFRED S. WILLIAMS and SIDNEY SCHNEIDER

A study of the most advanced techniques of scientific management concerned with development of work standards and measurement of work loads and performance, and of their adaptability in public administration. Statistical and experimental methods of determining standards. Dangers to avoid in setting standards. Time study. Standards as a dynamic part of operations, and a tool in developing policies on personnel placement and training. Standards as aids in developing budgets, in planning operations, and in individual work planning. Importance of dependable standards, measurement and appraisal of performance to summary statements of progress for the use of higher administrative officials. *Prerequisite:* Practical working experience at Grade GS-7 or above, or permission of instructors.

6-550. Techniques of Organization

Spring, 3 credits

PERRY R. TAYLOR

Organization of public agencies and development of procedures for getting work done. The character of management tools in government and in private industry from point of view of middle-management and supervisors. The relations of major subdivisions to top administration and to coordinate subdivisions. Problems of coordination in a decentralized organization geographically dispersed. Importance of clear definition of responsibilities and of vertical and horizontal relations. Coordination of activities, policies and objectives of components parts of an organization. *Prerequisite:* A course in public administration, scientific management, or O&M analysis.

FINANCIAL AND BUDGETARY ADMINISTRATION

COMMITTEE

JOHN L. WELLS (Chairman)

CHARLES L. GRANT
FRED A. McNAMARADAVID H. SPANIER
FRANK H. SPENCER

Students desiring a knowledge of how the Government obtains, budgets and manages its money will find helpful some of the courses in general administration as well as the specialized courses in this division. Those with limited experience in this field should begin their study with Federal Budgetary Procedure in the Division of Office Techniques and Operations, and the general administration courses before attempting the advanced course in Budgetary Administration.

The courses in hospital administration are designed for persons who are engaged in hospital or health administration in either private or government agencies. The two courses in Hospital Business Administration offer training for those who are concerned with the financial administration of hospitals: accounting, statistics, and budgeting. The general course, Hospital Administration, deals with the over-all management of the hospital as a whole and its various services.

6-635. Budgetary and Financial Administration

Fall, 2 credits

JOSEPH C. WHEELER

This is an advanced, one-semester course for experienced budget and administrative personnel. Covers the broad phases of budgetary and financial administration in the Federal Government primarily from the standpoint of the operating departments. Emphasizes the role of budget formulation and execution in the relationships between the legislative and executive branches of the Government and among the staff operating agencies within the executive branch. The first half of the course deals with the pre-appropriation phases of budgeting, including formulation, review, and congressional enactment of the budget. Topics discussed include: the role of budgeting in program formulation; the role of bureaus, departments, Bureau of the Budget, the President and Congress in budgeting; content of the budget and of departmental estimates and related budgetary materials. The second half of the course deals with the execution of the budget after it is enacted by Congress and the relationships of administrative planning and control, accounting, auditing, and financial reporting to budget execution. *Prerequisite:* Bachelor's degree and an introductory course in public administration; or experience at a responsible level in budgetary, financial or general administration; or consent of instructor.

6-525. Financial Organization and Procedures of the Federal Government

(See p. 71)

INSTITUTION MANAGEMENT

6-360. Hospital Business Administration I: Accounting, Statistics and Finance

Fall, 2 credits

DAVID H. SPANIER

Principles of hospital fund accounting; general fund income, expense and balance sheet accounts; temporary and endowment fund accounts; plant fund accounts. Adjusting and closing entries; prepaid and deferred items; preparation of trial balances. Hospital patient and hospital service statistics. Hospital financial and statistical statements. Cash receipts and accounts receivable procedures. Cash disbursements and accounts payable procedures. Inventories. Credits and collections. Payroll and personnel procedures. Check lists of equipment and supplies; depreciation; reserves. *Prerequisite:* Principles of Accounting or the equivalent in experience.

6-361. Hospital Business Administration II: Cost Analysis Methods and Budgeting

Spring, 2 credits

DAVID H. SPANIER

Principles of hospital cost analysis methods, rate structures and budgeting. Detailed cost analysis problems, organization of accounting department, principles of internal control and food cost accounting. *Prerequisite:* Hospital Business Administration I or its equivalent in experience.

6-461. Hospital Administration

Year, 4 credits

FRED A. McNAMARA and PIERRE S. PALMER

A course designed for those desiring to acquire a broad knowledge of the field of hospital administration. The first semester deals with the history of hospitals; the scope and organization of voluntary and Federal hospital programs; general principles of organization as applied to both Federal and voluntary hospitals; the functional elements of hospitals; and application of modern management tools in hospital administration. The second semester deals with additional examples of the application of modern management tools in hospital administration; control of quality of professional care of patients; management problems in such areas of hospital administration as food service, supply management, and length of patient stay; and problems of coordination of Federal hospital operating and construction programs.

The course is conducted through lectures and discussion periods. Guest speakers from Federal and voluntary hospitals present several of the topics. Credit is given only upon completion of both semesters and registration is limited to those planning to take both semesters. *Prerequisite:* Familiarity with hospital operations.

6-472. Food Cost Control

Fall, 2 credits

CLARICE D. GULLICKSON

Consideration of the basic problems of food cost control including recipe standardization, portion control, daily food cost control, storeroom and purchasing records, equipment records, and labor costs. Students will have opportunity to present situations peculiar to their own food service for group discussion. One hour lecture and two hours laboratory work on problems of food cost control. *Prerequisite:* Completion of courses in food purchasing for group feeding, quantity cookery, and institution administration or institution management; or their equivalent in practical experience, as approved by instructor.

PERSONNEL ADMINISTRATION

COMMITTEE

JAMES L. BUCKLEY (Chairman)	
C. O. HENDERSON (Vice-chairman)	WILLIAM T. McDONALD
G. E. HILBERT	JAMES C. O'BRIEN
HENRY F. HUBBARD	ROSS POLLOCK
HAROLD LEICH	JOHN M. WATTS

The student is urged to take the introductory course in public administration before concentrating on the program in this division. Unless substantial experience can be substituted, the general course, Public Personnel Administration, should be taken before the specialized courses (such as Position Classification, Selection and Placement, etc.). Persons who are in positions classified at GS-5 or below and desire to prepare for personnel work should begin with Federal Personnel Procedure in the Department of Office Techniques and Operations. They should not attempt to take the specialized courses until they have gained substantial experience in personnel work or have completed all basic, general courses.

6-430. Public Personnel Administration

Fall, 2 credits. Repeated in Spring

JERRY C. DOSTER

Designed for supervisors and administrators wishing to have general familiarity with personnel work, for those in junior personnel staff positions desiring a broad understanding of personnel administration, and for those desiring to enter the field who need a foundation for the more specialized courses in the personnel field. Personnel problems which arise when people are associated together in a work situation; basic personnel policies and practices necessary and useful in treating personnel problems; differences between responsibilities, with respect to personnel administration, of the supervisor and the personnel officer; the various phases of personnel work; study of merit system and forms of organization; civil service legislation at various governmental levels; relationships between the Civil Service Commission and operating agencies and personnel offices of latter; trends in public personnel administration and its relationship to overall management. *Prerequisite:* One of the following: Introduction to Public Administration; Course 108 or 114 in the Department of Office Techniques and Operations; Grades GS-4 or above in personnel work; 60 semester hours of college work.

6-444. Position Classification

Fall, 2 credits. Repeated in Spring and Summer

WILLIAM C. LAXTON and JOSEPH P. FINDLAY

Covers the fundamental concept of position classification and its uses; relation of classification to compensation and other phases of personnel management; analysis of Classification Act of 1949; identification, analysis and application to specific positions of factors determining class and grade levels; discussion of job evaluation techniques; and application of position classification in the Federal service including operating policies, practices and procedures. *Prerequisite:* One of the following: Courses 344 or 430 in Public Administration; Grade GS-4 or above in personnel work; 60 semester hours of college work.

6-448. Wage Administration

Fall, 2 credits

WILLIAM F. SORENSEN, JR.

Purposes, principles and methods of wage administration, with primary emphasis on compensation plans for trade, craft, and labor occupations. Study and discussion of various concepts and methods currently used in government and industry, including job analysis, job evaluation, labor market analysis, wage surveys, schedule construction, and within-grade advancement plans. *Prerequisite:* One of the following: Course 6-444, or experience in position classification and/or wage administration work.

6-458. Advanced Wage Administration

Spring, 2 credits

WILLIAM F. SORENSEN, JR.

Problems in administering wage programs; compensation of supervisors; pay relationships among white and blue collar positions; incentive systems; the role of line management in wage programs; coordination of wage programs; labor relations aspects of pay fixing. *Prerequisite:* One of the following: Course 6-448 or experience in wage administration work.

6-512. Employment and Utilization

Fall, 2 credits

MILTON M. MANDELL

Analysis of the problems and methods of employment and utilization. Study of the relationship of job analysis and recruitment to employment and utilization and study of specific evaluation methods. Emphasis on the administrative as well as technical phases of this subject. The course is intended for those in line management as well as staff positions.

6-518. Organizing and Administering a Personnel Development Program

Fall, 3 credits

WILLIAM ONCKEN, JR.

Designed for both operating and staff persons who carry management responsibilities in the training field and who influence training policy. Personnel training and development as a line responsibility. Determining needs for training and development, organizing for training, evaluation of training at all levels in the organization. Consideration of management development, executive development, supervisory development, and scientific, professional, and technical training. The role of top management in exercising its responsibility for developing the work force. Examination of new developments in training in the Federal Government, including proposed legislation, and consideration of the effects of these developments on the responsibilities of persons responsible for training policy and programs. Examination and evaluation of the experiences of governmental agencies and private industrial organizations in this field.

LEGAL ADMINISTRATION**COMMITTEE**

ASHLEY SELLERS (Chairman)

THOMAS J. FLAVIN

RALPH F. KOEBEL

DAVID REICH

6-320. Introduction to Administrative Law and Procedure

Fall, 2 credits

EDWARD C. JOHNSON

A survey, for the general student, of the nature of administrative law, its subject matter, and methods of administration. The rule-making and adjudicative or determining procedures by federal and state regulatory agencies and the remedies against administrative action receive special consideration.

The increased complexity of modern society has meant that administrative tribunals have played an expanding role in the regulation of life and property. This course includes a study of the law which controls and the regulations which are made by governmental officers to implement that law. A survey of economic and social forces involved in regulatory action. Material used includes regulations, orders and decisions of federal, as well as state and municipal bodies, which acquaints students with current developments in administrative law and procedure. Topics covered include: powers and duties of administrative authorities as they relate to the supervision of public, as well as private interests; means of enforcing decision; remedies against official action; legal qualifications for office; legal disqualification of officers; appointment, tenure, removal and compensation of officers; and related matters.

6-422. Business Law

Year, 2 credits each semester

EDWARD C. JOHNSON

Aspects of law essential to the conduct of modern business. Forms of business organization, bailments, property, sales, mortgages, negotiable instruments, contracts. This course is so arranged that students may attend both semesters or either semester. No subject matter, however, will be repeated.

6-425. Legal Aspects of Investigation—Criminal Evidence and Procedure

Spring, 2 credits

RALPH F. KOEBEL

Designed to provide investigative personnel and those desiring to prepare for such work, a background and insight into the legal aspects of their investigations: what types of evidence to seek; circumstances and conditions under which the evidence is to be obtained in order to have adequate probative value; and how to prepare such evidence for presentation in court or other procedure. Since all investigations are potential sources of prosecution, the requirements of criminal evidence and procedure often reach into the early stages of investigation. The instruction is designed to provide understandable information without overemphasis of technical aspects.

8-602. Public Utility Law for Engineers

(See p. 88)

PROCUREMENT AND PROPERTY MANAGEMENT

COMMITTEE

JOHN B. HOLDEN (Chairman)

CLIFTON E. MACK

FRANCIS R. MANGHAM

RALPH G. MCINTYRE

JAMES SCAMMAHORN

S. A. SNYDER

FRANK H. SPENCER

RAY WARD

Courses in this field deal with how the Government purchases, manages and accounts for materials and supplies. Those interested in purchasing but with limited experience in such work will find it helpful to begin with the courses in Federal Purchasing Procedure and Federal Property Procedure before attempting the management courses.

Selected background courses in public administration together with courses in the Division of Organization and Management will provide a thorough training in administration in this area.

8-405. Principles of Specifications (See p. 86)

8-420. Fundamentals of Standardization (See p. 86)

6-455. Management of Government Supply

Fall, 2 credits

JOHN B. HOLDEN

An advanced course covering the broad phases of handling and managing Government supply activities. Deals with supply policies, organization and management, finances, and laws governing supply. Includes the following topics: general review of purchasing, contracting and bid procedures; preparation and use of Federal specifications, standardization; decisions of the Comptroller General and regulations affecting supply activities; nature of public contracts as compared with private contracts; laws applicable to Government contracts for supply and construction; organization and management of purchasing offices; storage and issue operations, property accounting, property utilization, excesses and surpluses; delivery requirements, receipt of supplies and equipment, inspection tests, prequalification tests; inspection and review of supply work; management aspects—planning, small purchases, consolidating requirements; part played by General Services Administration, General Accounting Office, Federal Prisons Industries, Blind-made Products, and other Government facilities; new or current developments in the supply field.

6-638. Government Defense Contracts

Fall, 2 credits

JULIUS SILVERSTEIN

Laws and problems in defense contracting by the Federal Government, including such subjects as cost-plus contracts, contingent fees, priorities, subcontracting, escalation, financing, renegotiation, contract termination, and surplus property.

ACCOUNTING

COMMITTEE

JOHN C. COOPER (Chairman)

PAUL L. APPLEMAN
KARNEY A. BRASFIELD
ROBERT H. FUCHS

WARNER H. HORD
CHARLES N. MASON
ROBERT W. MAXWELL

HERSCHEL C. WALLING

The Graduate School offers accounting courses primarily as a means of training for the *public* service. The curriculum necessarily includes courses in general accounting because the basic principles are essential for Government accounting.

CERTIFIED STATEMENT OF ACCOMPLISHMENT IN ACCOUNTING

The scope of accounting in the Federal service is wide. There are increasing demands for accountants having a knowledge of commercial as well as Government accounting. These demands have come as a result of the formation of many Government corporations and Federal regulatory agencies. Hence, the accounting program required for a Certified Statement of Accomplishment is broad enough to cover not only the regular appropriation accounting of

the Federal Government, but also the accounting training needed for many other governmental activities. The program is comprehensive enough both to provide advanced training for the Government service, and also, if courses are carefully selected, to meet the usual educational requirements for C.P.A. examinations. Students planning to take C.P.A. examinations should know the requirements of the state in which they plan to take the examination. In general, their study, in addition to accounting, should include the following: Principles of Economics, Corporation Finance, Investments, Mathematics of Accounting and Investment, Business Law, Statistics, Business English, Principles of Marketing and Industrial Management.

Requirements for Certified Statement

1. High school diploma or equivalent.
2. Thirty-six semester hours of credit with grades of "C" or better in courses outlined below and distributed as follows:
 - a. All of the required courses.
 - b. No less than three semester hours credit from the Accounting Elective Courses.
 - c. No less than six semester hours credit from the Related Elective Courses.
 - d. The remaining semester hours credit may be taken in either of the two elective groups.

REQUIRED COURSES

<i>Courses</i>	<i>Number of Semesters</i>	<i>Semester Hours Credit</i>
Principles of Accounting	2	6
Intermediate Accounting	2	6
Cost Accounting	1	3
Auditing	2	4
Advanced Accounting	2	6

ACCOUNTING ELECTIVE COURSES

Federal Government Accounting	1	3
Federal Tax Accounting	1	3
Analysis and Interpretation of Financial Statements	1	2
Mathematics of Accounting and Investment	1	3
Federal Accounting Procedure	1	3
Federal Auditing Procedure	2	4
Budgetary Administration	1	2
Accounting Systems	1	2
Cost Accounting (Second Semester)	1	3

RELATED ELECTIVE COURSES

Business Law	2	4
Survey of Economics	2	6
Principles of Statistical Analysis	2	6
Writing Procedures and Instructions	1	2
or Introduction to Official Writing	1	2

6-352^a. Principles of Accounting—First Half

Fall, 3 credits. Repeated in Spring and Summer

HERBERT G. MARSHALL
WILLIAM H. ROWE
HAROLD J. SELINSKY
STANCIL M. SMITH

Elementary principles of accounting; discussion and problems. At the end of the semester students will be prepared to do the accounting necessary for a small business organization; i.e., keep a complete set of books, draw up statements at the end of the fiscal period, adjust the accounts for accruals, deferred items, depreciation, etc., and close the books. *Prerequisite*: High school graduation or equivalent.

6-352^b. Principles of Accounting—Second Half

Spring, 3 credits. Repeated in Summer and Fall

HERBERT G. MARSHALL
WILLIAM H. ROWE
HAROLD J. SELINSKY
STANCIL M. SMITH

Continuation of first half covering more advanced principles of accounting; accounting for partnerships, corporations and manufacturing; depreciation policies and analysis of financial statements. *Prerequisite*: First half or equivalent.

6-353^a. Intermediate Accounting—First Half

Fall, 3 credits

WARNER H. HORD

Advanced principles of manufacturing accounting, corporation accounting, and valuation as applied to current assets, fixed assets, intangibles, and liabilities, reserves and funds, installment sales. *Prerequisite*: A first year course in accounting.

6-353^b. Intermediate Accounting—Second Half

Spring, 3 credits

WARNER H. HORD

Advanced principles of partnership accounting, including formation, operation, and dissolution; joint ventures; consignments; agencies and branches; application of funds. *Prerequisite*: First half or equivalent.

6-354. Federal Government Accounting

Fall, 3 credits. Repeated in Spring

CHARLES N. MASON

A review of the development of the accounting system for Federal funds and the present financial organization in which the accounting is performed with attention to the accounting responsibilities of each segment of the organization, including the Treasury Department and the General Accounting Office. Detailed study is given to the accounting problems of administrative agencies with special emphasis on the principles of controls, financial reporting problems, and recent developments in accounting in the Federal government. *Prerequisite*: Two years of Commercial Accounting, or Federal Accounting Procedure and one year of Principles of Accounting or the equivalent.

6-420. Advanced Accounting—Theory and Problems

Year, 3 credits each semester

LAURENCE W. ACKER
EDWIN T. NOLAN

A comprehensive study of advanced principles of accounting together with their application to specific problems. Special consideration is given to consolidated statements; foreign exchange; receivership; estates and trusts; public accounts. Emphasis is placed on problems in accounting theory and practice such as are generally given in C.P.A. examinations. *Prerequisite*: Intermediate Accounting.

6-423. Mathematics of Accounting and Investment

Spring, 3 credits

RALPH R. BOTTS

Calculation of compound interest, compound discount, sum of annuities, present value of annuities and perpetuities; accumulation of sinking funds and amortization of debts by installments. Calculation of bond yields, bond values, premiums and discounts. Computation of depreciation by sinking fund method and fixed percentage of book value method. Some study is given to life probabilities and the computation of premiums and reserves for the more common types of life insurance and annuities. Accounting applications and entries will be discussed for those students interested in the accounting aspects.

[6-510.] Analysis and Interpretation of Financial Statements
(1956-57 and alternate years)

Spring, 2 credits

HERSCHEL C. WALLING

[6-525.] Financial Organization and Procedures of the Federal Government (1956-57 and alternate years)

Fall, 2 credits

CARL W. TILLER

6-642. Cost Accounting

Year, 3 credits each semester

JAMES H. LOBB
HARRY W. RICE

A thorough and comprehensive treatment of the principles of cost accounting, together with the methods of their application to specific problems. By means of lectures, textbook study, and problems, full consideration is given to the methods of cost accounting for materials, labor, direct and indirect expenses in their relationship to specific job orders; process, departmental and standard costs; and the control accounts. *Prerequisite:* Principles of Accounting.

6-645. Federal Tax Accounting

Fall, 3 credits

EUGENE C. MOYER

Federal taxation presented from the accounting viewpoint. Special attention given to income taxation. *Prerequisite:* Principles of Accounting; accounting experience desirable.

6-693. Auditing

Year, 2 credits each semester

JOHN C. COOPER

The fall semester is devoted to the study of the fundamental principles of public or commercial-type audits. Consideration is given to the purposes and types of audits; the responsibility of the auditor; planning and performing audits. Special emphasis is placed on problems in audit theory and practice such as are generally given in C.P.A. examinations.

In the spring semester, emphasis is placed on case studies in auditing and the application of audit principles. Special consideration is given to the field of internal audit as a tool of management and the utilization of internal audit in Government. *Prerequisite:* Intermediate Accounting.

6-694. Specialized Federal Accounting Systems

Fall, 3 credits

EDWIN T. NOLAN and SPECIALISTS

Designed to acquaint the students with the basic principles and standards for accounting in the Federal Government as promulgated by the Comptroller General, the reporting requirements of the Bureau of the Budget and Treasury Department and the development of improved systems by individual agencies within the over-all guidance. In addition to consideration of Government-wide developments, the systems of a diversified group of Federal agencies are used as case studies. *Prerequisite:* Intermediate Accounting, Federal Government Accounting, and Cost Accounting, or the equivalent.

[6-695.] Accounting Systems (1956-57 and alternate years)

Spring, 2 credits

EDWIN T. NOLAN

Social Sciences

DEPARTMENTAL COMMITTEE

BUSHROD W. ALLIN (Chairman)

MARY L. COLLINGS

H. DUNCAN HALL

SHERMAN E. JOHNSON

PAUL E. NYSTROM

HAROLD B. ROWE

CONRAD F. TAEUBER

CARL C. TAYLOR

JAMES E. THIGPEN

HARRY C. TRELOGAN (Vice-chairman)

FREDERICK V. WAUGH

BENNETT S. WHITE

PURPOSE AND SCOPE

Social science deals with people and the problems of human relationships, as contrasted with natural or physical science which deals with things and the problems arising out of physical relationships.

The problems of social organization and operation have become both absolutely and relatively more important with the increase in complexity of our industrial civilization. More and more, people are concerned with the organization of production, the distribution of goods and income, and with price policies. The individual as a consumer and investor, the businessman and the farmer as producers, find increasing need for a knowledge of economics and other social sciences. Large corporations are employing growing numbers of economists to help in the formulation of policy. Psychologists and social workers are finding a demand for their services in personnel work. And, the large number of Federal, state and local government agencies need more people adequately trained in social science.

Social science is divided into a number of closely allied fields including economics, sociology, political science, history, law, and psychology. A broad grasp of any one of these subjects implies at least some familiarity with the others, because of the many inter-relationships among these studies. Yet the continued development of each social science has given rise to larger and still larger bodies of knowledge relating to it, until only through a considerable degree of specialization can the student hope to master any one part. Thus the great need is for people who have concentrated sufficiently on one phase of a social science, such as marketing in economics, to be thoroughly familiar with the details of fact and principles involved, yet who also have a broad underlying training in the allied fields.

The courses offered by the Graduate School are designed to aid in acquiring a general background in the social sciences, as well as the specialized training in particular fields which is necessary for successful work in many Government departments and in private business.

GENERAL ECONOMICS

COMMITTEE

BUSHROD W. ALLIN (Chairman)

ROY J. BURROUGHS

HERMAN M. SOUTHWORTH

JAMES P. CAVIN

WALTER W. WILCOX

Adequate foundation training in general economics is essential for satisfactory accomplishment in the study of any specialized branch of the subject. Hence, the primary objective in developing the following list of courses has been that of providing the basic work needed, by students who wish to carry out a systematic plan of study, at both undergraduate and graduate levels.

7-201. Survey of Economics

Year, 3 credits each semester

ROY J. BURROUGHS

A survey course designed to equip the student with the simpler tools of economic analysis and with an understanding of the more important institutions of the economic system. The topics of the text are: (1) operations of the economy as a whole; (2) productive power and the methods of capitalism; (3) money and its use; (4) prices and economic organization; (5) the distribution of income, and (6) further areas of government action. *Prerequisite:* A year of college work or its equivalent.

[7-480.] Money and Banking (1956-57 and alternate years)

Year, 2 credits each semester

RICHARD A. RADFORD

7-481. Business Forecasting

Fall, 2 credits

NATHAN M. KOFFSKY

National income analysis as a tool for forecasting economic fluctuations. The meaning of the Income and Product accounts and the data that underlie them. The impact of changes in spending by consumers, business, and government on the total economy. The data which give clues to such changes, such as the Federal Budget, business investment plans, and consumer behavior. The national product "gap" analyses as a tool in measuring the direction and extent of changes in economic activity. Brief review of business cycle theory and measurement, including the Historical School and the work of the National Bureau of Economic Research. Analysis of the President's Economic Report. Long-term projections of economic growth. *Prerequisite:* A course in elementary economics and a course in statistics.

7-483. Fiscal Policy

Spring, 2 credits

FREDERICK D. STOCKER

Governmental finances, particularly as they affect the gross national product and employment. Basic assumptions, values, and priorities in a full employment fiscal policy. Economic implications of various taxing, spending, and debt policies, and the relationship of fiscal to monetary measures. The problem of inflation and depression. Primary emphasis is on Federal finances, but the role of State and local financial policies is also discussed. *Prerequisite:* A basic course in economics.

7-548. Economic Analysis

Year, 3 credits each semester (alternate years)

WILLIAM A. VOGELY

The course is concerned with methods of economic analysis. Emphasis is placed upon the exposition and evaluation of theoretical models explaining the relationships among various sectors of the economic system. Empirical applications of these tools of analysis are studied. The first semester is primarily concerned with analyses of the behavior of firms, households, and industries. The theories of demand, production, distribution, and price are studied intensively, including systems of both partial and general interdependence. The second semester is primarily concerned with analyses of the behavior of economic aggregates. The theories of employment, national income, and economic development are studied, with particular attention to the contributions initiated by Lord Keynes. *Prerequisite:* A course in the principles of economics.

7-560. Modern Economic Thought

Spring, 3 credits

BUSHROD W. ALLIN and JAMES P. CAVIN

A review of the ideas of the leading economic theorists of the past fifty years, including those of Marshall, Veblen, Commons, Mitchell, and Keynes. The purpose of the course is to help the student understand the relevance of the principal contributions of these men in dealing with the economic problems of the American economy.

**[7-570.] Statistical Analysis Applied to Economic Problems
(1956-57 and alternate years)**

Year, 2 credits each semester

RICHARD J. FOOTE

AGRICULTURAL ECONOMICS**COMMITTEE**

BENNETT S. WHITE (Chairman)

PHILIP F. AYLESWORTH
FLOYD E. DAVIS
HORACE R. JOSEPHSON

H. M. SOUTHWORTH
ROBERT M. WALSH
EVERETT C. WEITZELL

The great importance of enlarging and improving knowledge of the economics of agriculture is generally recognized. Constructive accomplishment in this field requires thorough training in economics combined with a comprehensive grasp of its application to the special conditions of agriculture. Such a balanced combination can best be achieved by following a systematic course of study appropriate to the particular area of concentration desired. The courses offered by the Graduate School permit students to carry out such plans of study with concentration in the economics of agricultural production, agricultural finance, prices, and marketing. The electives and general interest courses provided also permit the adaptation of study plans to meet the special interests of individual students.

Shortage of well-trained marketing personnel, at both Federal and State levels, critically handicaps developing a well-rounded

program under the Agricultural Research and Marketing Act. The greatest immediate need is for men with advanced training who can undertake independent work in new fields. The broad expansion of activities scheduled under the Act also will continue and intensify the need for adequately prepared college graduates. On both problems the Department of Agriculture is cooperating closely with land-grant institutions. Joint committees have analyzed and mapped out attack on these problems. As part of this plan the Graduate School has given special advanced training to Washington personnel engaged in marketing work, and regularly offers both introductory and advanced courses in this field.

While the courses in agricultural economics will be regularly scheduled as listed below, it may be possible for students to make special arrangements to have the courses given in the years when they are not scheduled. Students interested in such arrangements should apply to the Registrar.

CERTIFIED STATEMENT OF ACCOMPLISHMENT IN AGRICULTURAL ECONOMICS

The Graduate School offers a Certified Statement of Accomplishment to students who have completed 30 credits of graduate work in agricultural economics, including the basic graduate courses in economics. To qualify, it is necessary to follow the specific sequence of courses that are listed for three fields of concentration indicated below.

The Certified Statement of Accomplishment is not an advanced degree, but it constitutes evidence of completion of an organized course of study in the field of agricultural economics. It is a certification that the student has completed a program of study which prepares him for effective public service in agricultural economics work.

COURSES LEADING TO CERTIFIED STATEMENT OF ACCOMPLISHMENT IN AGRICULTURAL ECONOMICS

(With Concentration in Specified Fields of Application)

BASIC UNDERGRADUATE COURSES

Required foundation courses. Carry undergraduate credit only and may not be used to meet the credit hour requirement for the certified statement. Equivalent courses will be accepted by transcript from other institutions.

The number in parenthesis after course title indicates semester hour credits.

<i>Economics of Production</i>	<i>Agricultural Finance</i>	<i>Prices and Marketing</i>
Survey of Economics (6)	Survey of Economics (6)	Survey of Economics (6)
Principles of Statistical Analysis (6)	Principles of Statistical Analysis (6)	Principles of Statistical Analysis (6)
Introduction to Marketing (3)	Introduction to Marketing (3)	Introduction to Marketing (3)

REQUIRED BASIC GRADUATE COURSES

Economic Analysis (6)	Economic Analysis (6)	Economic Analysis (6)
Money and Banking (4)	Money and Banking (4)	Money and Banking (4)

REQUIRED SPECIALIZED GRADUATE COURSES

Farm Management (2)	Farm Management (2)	Economics of Marketing (4)
Production Economics of Agriculture (3)	Production Economics of Agriculture (3)	Agricultural Policies and Programs (2)
Agricultural Policies and Programs (2)	Agricultural Policies and Programs (2)	Marketing Seminar (2)

ELECTIVE GRADUATE COURSES

Select courses in agricultural economics and related fields in consultation with Graduate School advisers to complete the 30 graduate credits required for certified statement of accomplishment.

7-203. Introduction to Marketing

Fall, 3 credits (alternate years)

BENNETT S. WHITE

A preliminary course intended to provide orientation for the study of marketing as (1) a type of production which supplies essential services, and (2) a valuation process in which the prices of agricultural commodities are established. Marketing machinery costs, functions, methods and practices are surveyed. Marketing specialists of the Department of Agriculture will lead discussions relating to particular commodities and special problems. *Prerequisite:* A basic course in economics.

[7-409.] Farm Management (1956-57 and alternate years)

Fall, 2 credits

WYLIE D. GOODSELL

[7-414.] Economics of Marketing (1956-57 and alternate years)

Year, 2 credits each semester

H. M. SOUTHWORTH and HARRY C. TRELOGAN

7-472. Production Economics of Agriculture

Fall, 3 credits

KENNETH L. BACHMAN and RUSSELL W. BIERMAN

The development and application of basic economic principles and analytical methods important in agricultural production. Application of economic principles to the determination of the most profitable combination of production resources and enterprises from the standpoint of both the individual farm and United States agriculture. Particular problems studied are agricultural risk and uncertainty, changes in agricultural production and practices, agricultural finance, credit and insurance, land values and tenure, and low income farms.

[7-716.] Agricultural Policies and Programs—Seminar (1956-57 and alternate years)

Fall, 2 credits

KARL A. FOX and WALTER W. WILCOX

7-719. Resource Economics—Seminar

Spring, 3 credits

MARK M. REGAN

Practices and problems in the economic analysis of land and water resource programs. Study of prevailing and proposed practices for project formulation, economic justification and cost sharing. Analysts and administrators of various resource agencies participate in discussions of their special fields. *Prerequisite:* Graduate work in agricultural economics, or consent of instructor.

[7-720.] Production Policies and Programs—Seminar
(1956-57 and alternate years)

Spring, 3 credits

SHERMAN E. JOHNSON and ASSOCIATES

7-722. Marketing—Seminar

Spring, 2 credits (alternate years)

HARRY C. TRELOGAN

A seminar for advanced students interested in current research and service developments. Selected projects are reviewed to indicate newer research techniques and service methods used in agricultural marketing. Projects are examined in terms of background need for the work, objectives of the activities, and relationships to other phases of a general program of marketing research. Economic, statistical and management problems involving market costs, quality, organization and information are featured in the material selected for analytical review. A term paper on a related topic will be required for credit. *Prerequisite:* Courses in elementary economics and statistics plus advanced courses or responsible experience in marketing.

TRANSPORTATION

7-145. Principles of Transportation

Fall, 2 credits. Repeated in Spring

JAMES F. PERRIN

The historical development of transportation from the earliest time to the current transportation system in the United States. Methods used for performing transportation, the services rendered by the transportation agencies, and distinctions between those services. Terms and definitions used in describing transportation services as compared to the pricing of goods.

7-245. Transportation Rates and Rate Determination

Spring, 2 credits

ABBEFORD S. DOLCH

The use of traffic documents, commodity classifications, tariffs, and traffic publications for the several forms of transportation. Study of rate principles and the history of major rate adjustments. *Prerequisite:* Principles of Transportation, or experience in rates and rate determination.

7-246. Traffic Management

Fall, 2 credits

JAMES F. PERRIN

Designed to acquaint transportation students with the principles and practices of traffic management from both Governmental and commercial points of view. Emphasis on functions of a traffic department, both industrial and Governmental, and on relations between carriers and traffic departments, with a considerable portion of the emphasis placed on transportation law. *Prerequisite:* Transportation Rates, or experience with rates and tariffs, or permission of instructor.

COOPERATIVE EXTENSION EDUCATION

COMMITTEE

MARY L. COLLINGS (Chairman)

ROY BECK

C. C. LANG

CANNON C. HEARNE

ALICE LINN

BARNARD JOY

JOSEPH L. MATTHEWS

KENNETH F. WARNER

Cooperative extension education consists of the off-campus, non-resident teaching service of the land-grant institutions in coopera-

tion with the USDA and the leadership of a county. It is the largest non-school educational program in the United States. The growing interest, on the part of county agents, supervisors, specialists, and training personnel, in advanced study under the guidance of the Federal extension staff has led the Graduate School to appoint a committee on Cooperative Extension Education. This committee has the responsibility for giving guidance to students toward a program best suited to the individual's needs, within the framework of the Graduate School. This program may well lead to an advanced degree depending upon the plans of the student and the cooperative arrangements with local educational institutions and the Graduate School.

The following courses are given as the demand justifies:

7-450. Principles and Techniques of Extension Teaching

Spring, 2 credits

Instructor to be announced

This course is designed primarily for extension workers. The principles and techniques of educational methods are applied to extension work. The relative influence of teaching methods are studied from the point of view of reaching and teaching more people.

7-535. Methods of Evaluating Educational Programs

Fall, 2 credits

LAUREL K. SABROSKY and OTHERS

Clarification of objectives, data collection, sampling procedures, analysis, interpretation, presentation, and use of data. This course is especially adapted to extension programs, but principles and procedures are applicable to all voluntary educational programs. It is not the intention to make a "studies expert" of each student, but to give a broad concept of methods of systematically appraising work and programs.

7-595. Four-H Club Organization and Procedures

Fall, 2 credits

E. W. AITON and STAFF

Specially designed for county extension agents and other extension youth workers, this course stresses 4-H Club objectives, philosophy, and the principles and operational aspects of planning and conducting effective youth programs.

7-596. Development of County Programs

Spring, 2 credits

JOSEPH L. MATTHEWS

A systematic study of methods of developing voluntary county educational programs, including sources of essential basic information; the role of lay people and of supervisors, specialists, and county workers; use of planning committees; step-by-step procedures; coordinated county plans; and characteristics of good programs. Special reference will be made to Extension programs, but principles and procedures are applicable to all voluntary educational programs.

7-732. Four-H Club Programs—Seminar

Spring, 3 credits

E. W. AITON

Major emphasis in this seminar is on objectives and principles for planning effective educational programs for rural young people at the county level. Class periods are devoted to presentations, discussion, and some lecture. Individual problems of class members are considered.

HUMAN RELATIONS

COMMITTEE

CONRAD F. TAEUBER (Chairman)

KATHARINE P. BEARDSLEY
JOHN M. BREWSTERFORREST E. CLEMENTS
MARGARET J. HAGOOD

CARL C. TAYLOR

Courses in human relations are planned to meet the needs of four types of students: (1) those who wish a general rather than specialized knowledge of social problems and processes; (2) those who wish substantial first undergraduate courses in sociology and psychology; (3) those who wish specialized undergraduate and graduate courses in these same fields; and (4) mature persons who wish courses which use the knowledge of all social sciences in considering public issues and policy.

Undergraduate students who have not had general orientation in the field of sociological sciences should enroll in Introduction to the Study of Human Relations so that, during the progress of the course, they may decide which of the specialized subject matter fields they care to pursue further. Most of the first courses in specialized fields of psychology and sociology are so placed as to give students who take this basic course the opportunity to pursue their specialized interests in a following semester.

7-105. Introduction to the Study of Human Relations

Fall, 2 credits. Repeated in Spring

STANLEY K. BIGMAN

A study of the contributions of the various social sciences, but especially sociology, psychology and anthropology, to an understanding of human behavior. An integrative course for students who have not had an opportunity to study any of the sociological sciences. Designed to acquaint students with techniques and principles used in describing and analyzing human relations. Should not be taken by students academically prepared to do advanced work in this field.

7-210. General Psychology

Fall, 3 credits. Repeated in Spring

RICHARD S. FITZPATRICK

A study of the basic patterns of human behavior, instincts, habits, ideas and attitudes. The course begins with a thoroughgoing analysis of the human nervous system and concludes with an analysis of personality. A non-laboratory course.

7-215. General Sociology

Spring, 3 credits

E. GRANT YOUMANS

The purpose of the course is to orient the student to the fundamental concepts and principles in human social behavior: the role of science in understanding human behavior, geographic and biological factors in human behavior, uniformities and variations in culture, social organization and disorganization, socio-psychological dynamics in normal and abnormal personality development, race relations, social class and caste, American social institutions, social and cultural change. Lectures, class discussions, student reports, films, and field trips.

7-303. Child and Adolescent Psychology

Spring, 2 credits (alternate years)

KATHARINE P. BEARDSLEY

Study of the development of human behavior from the prenatal period through adolescence in terms of the processes of physical, mental, emotional and social growth in the individual. Particular emphasis will be given to the interactions of the child's total personality.

7-304. The Conditions of Personality Growth

Fall, 2 credits (alternate years)

KATHARINE P. BEARDSLEY

This course treats the principal factors influencing personality development: physiological bases, early experiences and cultural determinants. It considers both experimental and clinical contributions to the study of personality, and their application to practical problems of understanding and dealing with people.

7-325. Managing Personal Finances

Fall, 2 credits. Repeated in the Spring

C. M. MOUSER

The course has three main purposes: (1) to assist persons in planning the management of their finances to meet future needs; (2) to discuss principles which govern day by day financial decisions; (3) to acquaint students with the major financial instruments. Topics included are: building up of savings for such purposes as the education of children; plans for home ownership; fund for old age and retirement; renting versus owning a home; costs of home ownership; financing durable and other consumer goods; sources and costs of consumer credit and installment buying; life insurance and annuity contracts; protection versus savings; property liability and other insurance programs; planning and administration of estates; joint ownership; laws of intestacy; making a will; administration of estates as executor or administrator; proof of will, costs and fees; deeds, abstracts, mortgages, trusts, contracts, notes, stocks, bonds, debentures, and savings account; an introduction to the mathematical calculations needed in order to understand and use these instruments.

7-400. Introduction to General Semantics

Fall, 2 credits. Repeated in Spring

J. A. SAUNDERS

General Semantics may be defined as a study of human responses to language and other symbols; the relationships between words and things and between language and human behavior. It may be considered as a synthesis of science and the formulation of the general methods of science in such a way that they may be applied by the average individual to help him solve his every problem. The great majority of people who learn to apply the principles and methods of semantics find that these facilitate communication between individuals and between groups; eliminate the common errors in thinking which practically everyone makes at times and enables them to find more appropriate solutions to many of their problems (personal, professional, economic and social) in a shorter period of time and with a less expenditure of energy.

7-433. Social Psychology

Spring, 3 credits

CARL C. TAYLOR

A general course on the social aspects of personality, social interaction and collective behavior. It includes treatments of cultural conditioning of personality, personality measurement, communication, public opinion, propaganda, censorship, mobs, riots, and social movements. *Prerequisite:* A course in general psychology.

[7-442.] Personality Disorders (1956-57 and alternate years)

Spring, 2 credits

ALBERT C. CORNSWEET

6-453. Human Relations in Administration (See p. 62)**7-482. Social Psychology of Communication**

Fall, 2 credits (alternate years)

RICHARD S. FITZPATRICK

Interpretation of communication research studies in light of social psychological theory. Analysis of social psychological theory for insight into communication habits and impact. Study of the social psychology of perception, value, leisure time, and cultural differences as they affect communications by mass media. Learning theory and educational level as they affect communication behavior. Communication behavior in selected cultures. Social psychological bases for opinion formation and implications of opinion shifts and changes. Analysis of communication systems and data for research purposes. Constructing a theory of the social psychology of mass media. *Prerequisite:* Permission of instructor.

7-533. Research Methods in Human Relations

Spring, 2 credits (alternate years)

RICHARD S. FITZPATRICK

Acquaints the student with the techniques available to solve problems involving human relations in an organizational setting by standard research methods. Students are required to identify problems, show how they have been studied in the past and suggest new or modified approaches for investigating them. Includes systematic examination and appraisal of surveys (extensive, intensive, and informal interviews), scales, projective techniques, pencil and paper texts, observational techniques, re-analysis of existing data, field and laboratory experiments. *Prerequisite:* Courses in sociology and psychology.

7-730. Seminar—Cultural Change in Relation to Educational and Developmental Processes in Contemporary Cultures

Fall, 2 credits

M. L. WILSON, THELMA A. DREIS, and SPECIALISTS

A survey of past and present international and national programs in the field of technical assistance in cooperation with other countries. Analysis and discussion of case histories. Presentations by individuals who have had significant experience in connection with Point IV programs. Development of criteria for evaluating the effectiveness of these programs and the basic problems, principles and lessons for the future which grow out of them. Administrators, social scientists, educators and various technical people in Washington who have had Point IV experience meet with the seminar. Special emphasis given to the development of programs by foreign countries and problems of coordination in the fields of agriculture, health, education, public administration and resource development. Consideration of various types of methods and techniques at the village level, together with techniques connected with training, administration, and evaluation. While the point of view of the course is the total culture and economy of a country, emphasis is placed on the rural aspects and village development with some consideration of urban programs.

HISTORY AND INTERNATIONAL RELATIONS**COMMITTEE**

H. DUNCAN HALL (Chairman)

O. B. CONAWAY, JR.
FRED J. ROSSITERCLAYTON E. WHIPPLE
FRANCIS O. WILCOX

Courses on history and international relations have a central place in any university. This is specially true in relation to the

Graduate School which serves the needs of government employees, for officials and students in Washington live and work in an international atmosphere. International facts and problems are part of their daily background. They have to be specially aware of the subtle interplay of national and international aspects of government activities. They meet, and many of them work with, foreign officials. In addition to the need—shared with every alert citizen—to understand the main underlying factors in world politics and economies, they have a special occupational interest. They need to learn something about the ideas, assumptions and national backgrounds of foreign officials, about how foreign governments work, how things are done in foreign countries. They need to be aware of the factors that affect the policies of other countries as well as their own.

The Graduate School is making an effort to meet these special needs. Its program, which is designed to make more effective use of the unique local teaching resources in Washington as a world capital, should be especially useful to individuals likely to have personal contacts with foreign officials and businessmen and those who have to deal with problems which have international aspects, including American interests in foreign countries. The program also will be of value to those who wish to increase their understanding of foreign affairs in a general way, or in a particular field.

7-250. American History to 1865

Fall, 3 credits

WAYNE D. RASMUSSEN

A survey of the political, social, economic, and cultural forces, prior to 1865, which have contributed to the development of American civilization. Includes a summary of the colonial period; the political, economic, and diplomatic factors of the American Revolution; and the development of national life and institutions.

7-251. American History since 1865

Spring, 3 credits

WAYNE D. RASMUSSEN

A survey of the political, social, economic, and cultural forces which, since 1865, have contributed to the development of present-day American civilization. Includes the frontier movement and immigration; constitutional growth and changes in world relations; and economic change and development.

7-324. International Relations

Fall, 3 credits

H. DUNCAN HALL and H. M. SPITZER

An introductory course dealing with the permanent and basic elements in world politics. Topics include the nature, motive forces, and organization of the State system; international politics as a struggle for power; the nature, role, and limitations of national power; the balance of power; the factors of morality and law; geography, climate, fertility; the role of frontiers, dependent areas and peoples; "international frontier" areas and their phenomena; the human factors; population, culture, war in the minds of men, the role of aggression; ideology; the economic factors—raw materials, industry, technology; war defense and peace; international organization.

7-436. The United States and Asia

Spring, 3 credits

ESSON M. GALE

Historical background of current problems and conflicts confronting the United States in relation to China and Southeast Asia. China before the revolution and under Communism. Relation of the Communist regime to Chinese traditions. Emergence of new states in Southeast Asia.

7-454. The British Commonwealth and the United States

Spring, 3 credits

H. DUNCAN HALL

Survey and analysis of the growth, nature, structure, and working of the Commonwealth and its role as an ally of the United States. The eight member States, the older British Commonwealth, and the new Asian members (India, Pakistan, Ceylon). The effect of expansion in Asia and Africa. The Commonwealth as the West's bridge with Asia and Africa. The institutions and international machinery of the Commonwealth. Foreign and defense policies. The Commonwealth's bonds of history, constitutional structure, family, Crown, and common citizenship. The governing elements of each member State (Ministers, parliaments, law officers, civil servants, members of armed forces). Common symbols, allegiance, channels of communication, interests. Role of Commonwealth in world politics; relations with the United States, Asia, Europe and the Atlantic system, Africa, the United Nations. Economic and cultural relations.

7-474. American Foreign Relations, Policies and Practices

Spring, 3 credits

Instructor to be announced

Fundamental principles as developed in the conduct of our foreign relations from the Declaration of Independence up to the close of the free immigration period in 1925; significant subsequent developments through and following World War II, requiring us to accept and meet the responsibilities which go with our position among the nations.

United States Government organization for conducting its business with other governments. Factors which have played major roles in the development of foreign policy: commerce, international finance, shipping, fishing, agriculture, etc.; public opinion and the influence of media of mass communication; minority and pressure groups; etc. Implementation of foreign policy in peace and war, choice of people and machinery; informing other peoples about ourselves and how best to accomplish it. Need for effective coordination of our governmental machinery so as to identify and harmonize the needs and convictions of the whole American people in a united common action for the achievement of their ideals. Present methods of coordination. Other possible methods, including the Secretariat system.

7-475. International Communication

Fall, 3 credits

EDMUND S. GLENN

A study of the difficulties of communication between nations which spring from differences in language and habits of thought. Considers such questions as the following: Can the ideas and proposals of one linguistic, national, and cultural group be transposed by purely linguistic means in such manner as to be understood by another linguistic, national, and cultural group? Should a proposal be thought out in a special manner if it is to be put before representatives of another culture or sub-culture?

Technology

DEPARTMENTAL COMMITTEE

R. G. HAINSWORTH (Chairman)

EVAN L. FLORY
ROWLAND LYON
ELBRIDGE C. PURDY

J. P. SCHAEZNER
E. J. STOCKING
G. C. TEWINKEL

ROBLEY WINFREY

—O—

Various departments and agencies of the Federal Government are engaged in programs such as flood control, soil conservation, power development, mapping, and rural electrification, which involve in varying degrees engineering techniques and professional engineers. They include many functions which require a working knowledge of techniques not provided in the standard engineering courses.

Basically, education in engineering schools is limited by necessity and tradition to a period of four or five years. This short period of training provides sufficient time to assimilate and master only a minimum of the basic sciences. There is little time available for courses which will give the technical student an understanding of the social and economic problems of the world about him. As a result, he fails often to appreciate the impact upon society of the advances of his profession. Moreover, technological techniques and practices are never static and developments in the sciences and in engineering require enlarging and constant reorienting of the engineer's technical background.

The Graduate School, working with representatives of the various Government departments and agencies and of the local chapters of engineering societies, offers courses designed to add to the technical, professional, and administrative background of engineers in the service of the Federal Government. Many courses offered provide training in the latest techniques that colleges and technical institutes often cannot provide.

—O—

ENGINEERING

COMMITTEE

J. P. SCHAEZNER (Chairman)

J. A. C. CALLAN
J. H. GEHRING
FERDINAND KAUFHOLZ
E. J. PETERSON

W. D. POTTER
HENRY A. SAWCHUCK
F. F. SNYDER
JOHN A. WEBER

8-92. Engineering Review for P. E. Examination

Fall, non-credit. Repeated in Spring

PAUL S. DELL'ARIA

A general refresher course in basic sciences and engineering principles intended to assist in preparation for the basic portions of the District of Columbia

Professional Engineer's License Examination (not specific branches of engineering). Covers elements of strength of materials, structures, fluid mechanics, mechanical engineering, electrical engineering and engineering economics. *Prerequisite:* Preferred, those qualified to take the P. E. examination.

8-110. Principles of Electricity

Spring, 2 credits

DAVID ASKEGAARD

Principles of electricity, emphasizing alternating currents. Covers basic units such as voltage, current and power and their measurement, resistance, voltage regulation, line loss, power factor, three phase systems, etc. The function of equipment used on rural electric distribution systems such as generators, substations, transformers, lightning arrestors, fuses, oil circuit reclosers, etc., will be emphasized.

8-115. Practical Radio and Television

Year, 3 credits each semester

ROBERT HAUPTMAN

A lecture-demonstration course covering the practical aspects of radio, television, and allied subjects. The use of mathematics is held to a minimum and the basic studies are undertaken in a simple descriptive manner. The first semester deals with electronics fundamentals, amplifiers, and radio receivers. Specific topics include: principles of electronics and radio; electronic components; DC and AC circuit characteristics and analysis; electron tubes; amplifiers; radio receiver fundamentals and applications. The second semester deals with radio transmitters, FM, TV, and miscellaneous subjects. Specific topics include: radio frequency regeneration; radio transmitter fundamentals and applications; fundamentals and applications of frequency modulation and television; propagation, radiation, and antennas; sources of power; test equipment.

This is not a laboratory class. An electronics demonstrator is used in class. Purchase of a radio kit is optional with the student. *Prerequisite:* A general knowledge of algebra and physics of at least high-school level.

8-405. Principles of Specifications

Fall, 2 credits

BENJAMIN ROSENZWEIG

A basic course in the principles underlying the government specifications systems. A brief survey will be made of procurement documents and the purposes they serve. The organization of specifications for form, clarity, and effectiveness will be demonstrated. The evolution and ramifications of specifications will be considered with regard to research and development; legal and contractual relations; proprietary items; and government inspection. The division of specifications into performance and formulation types will be reviewed. The problems of standardization and industry coordination will be discussed. *Prerequisite:* Knowledge of procurement, inspection, research and development processes, or specification writing.

8-420. Fundamentals of Standardization

Spring, 2 credits

BENJAMIN ROSENZWEIG

A course in the basic principles underlying the concepts of standardization from the engineering and management points of view. Presents the need for rationalizing the approach to design, production, procurement, and supply. Topics included are: the transition from unorganized systems; the development of a common terminology; the creation of a system of control data; a systematic analysis leading to a simplification of supply systems; the contribution of organized specifications to standardization; forms of engineering standardization; the concept of standardization as a management tool. *Prerequisite:* Work in specifications or standards development, procurement, supply, cataloging, or engineering.

8-465. Applied Electronic Theory

Year, 2 credits each semester

H. WALTER PRICE

General principles of electronics; basic characteristics of resistance, capacitance, and inductance taken singly and in combination; practical basic components; elementary circuit analysis particularly as it pertains to series and parallel resonance; circuits with distributed constants; generation and propagation of radio waves; fundamental principles of electron tubes including diodes, triodes, and pentodes; voltage amplification.

The second semester is a continuation and elaboration of subjects undertaken in the first semester: Class A, B and C power amplification; rectifiers and power supplies; sine-wave oscillators; amplitude modulation and detection; frequency modulation; transmitters; receivers including the superheterodyne; basic pulse circuits; fundamentals of television; theory and use of test equipment.

This is an intermediate level course stressing how electronic circuits work. Elementary complex notation will be introduced and extensively used. *Prerequisite:* Physics, algebra, trigonometry, DC electricity, AC electricity, or consent of the instructor. A knowledge of elementary calculus is helpful but not necessary.

8-525. Transistor Electronics

Year, 2 credits each semester

ALBERT M. RUBENSTEIN

An introduction to semiconductor principles, point contact transistors, junction transistor, p-n-p and n-p-n transistor characteristics, transistors as low and high frequencies circuit elements, transistor amplifiers and oscillators, measurement of small signal parameters (α , a and b), cascade amplifiers, noise in transistors, compensation for temperature variation, equivalent network circuits, and other related topics. *Prerequisite:* Bachelor's degree in physics or electrical engineering, or equivalent professional experience.

5-533. Hydrology

(See p. 53)

5-535. Elements of Fluid Mechanics

(See p. 53)

8-560. Fundamentals of Telephony—Outside Plant Design

Fall, 2 credits

THOMAS J. McDONOUGH

A course in the principles of outside plant design. Pole line, aerial wire, cable, protection, transposition systems and transmission improvement.

8-561. Fundamentals of Telephony—Central Office Equipment Design

Spring, 2 credits

THOMAS J. McDONOUGH

A course in the principles of central office equipment design. Design of major circuits, trunk circuit design, signaling and supervision, characteristics of the dial equipment of six manufacturers, traffic determinations for manual and dial systems, numbering, automatic message accounting equipment and other optional equipment and features, influence of toll dialing on central office design, latest advances in voice frequency repeaters, carrier and radio.

8-574. Rural Telephone System Design

Fall, 2 credits

THOMAS J. McDONOUGH

In this advanced course in telephony the students apply the principles discussed in Fundamentals of Telephony I and II, in the design of a complete telephone system for a specific rural area. The economy of various methods of serving the area are demonstrated. Annual charges are used in developing the most economical system. The effects of connecting company agreements and inter-toll dialing requirements are demonstrated. *Prerequisite:* Fundamentals of Telephony I and II or consent of the instructor.

8-602. Survey of Public Utility Law for Engineers

Fall, 2 credits

LOUIS C. KAPLAN

Designed to acquaint engineers with the basic legal principles underlying the expanding field of regulation of public utilities by national and state agencies. Particular consideration is given to the practical problems which arise in the presentation of a case before the public utility regulatory commission and the engineer's role in such proceedings. Special consideration is given to the highly developed methods and techniques used in the regulation of distribution of electricity and natural gas.

[8-664.] Distribution Line Design (1956-57 and alternate years)

Fall, 2 credits

J. J. A. JESSEL and ALMON D. THOMAS

[8-665.] Transmission Line Design (1956-57 and alternate years)

Spring, 2 credits

J. J. A. JESSEL and ALMON D. THOMAS

8-702. Electric Utility Engineering

Year, 2 credits each semester (alternate years)

J. J. A. JESSEL and ALMON D. THOMAS

Fundamentals of electric utility engineering and their practical application to the generation, transmission and distribution of electric energy by the electric power industry. Designed to give engineers a broader understanding of the basic functions of operating electric utilities and of the basic engineering principles applied thereto. Subjects covered include: a general description of production, transmission, and distribution facilities of an electric utility, including each major unit of property and an explanation of its functions; design and operation of electric generating stations, transmission lines and substations, and distribution substations, feeders, transformers and service drops; practices followed by electric utilities in serving different classes of customers. *Prerequisite:* Degree in engineering or equivalent experience.

SURVEYING AND MAPPING**COMMITTEE****G. C. TEWINKEL (Chairman)**

WALTER DIX

GEORGE H. EVERETT

JAMES P. FONDREN

W. S. HIGGINSON

S. J. FRIEDMAN

J. E. KING

GUNNAR LEIFSON

ALBERT L. NOWICKI

ROBERT H. RANDALL, JR.

LANSING G. SIMMONS

Maps have played an important part in human progress. Today, as never before, they furnish the basis for both military and non-military activities throughout the world. Greater use of maps has brought increasing demand for persons qualified in each of the technical phases of map production and reproduction.

The purpose of the curriculum in surveying and mapping is to offer basic training for those persons who are engaged in the technical and supervisory aspects of map making. The curriculum is intended to give the student a broad knowledge and basic under-

standing of each of the separate phases of the science; to enable him to understand better the problems, possibilities, and limitations of each of the phases. He can then better plan his own activities toward the economical production of accurate maps. A large part of the curriculum is devoted to geodesy, a subject considered to be of increasing importance in view of modern rapid means of world-wide travel, the consequent need for world-wide charts, and the development of new methods in surveying.

CERTIFICATES OF ACCOMPLISHMENT IN SURVEYING AND MAPPING

Certified Statements of Accomplishment in Surveying and Mapping are granted to students who have completed organized courses of study intended to provide basic training for responsible surveying and mapping work. The background required is not necessarily a college degree, but accomplishment of the work leading to the Undergraduate Certificate provides training approximately equivalent to that gained from a year of technical college work. The student completing the courses leading to the Advanced Certificate has acquired technical knowledge at least at the level of the Master's Degree. While neither certificate requires entrance backgrounds of any specified level of college education, the student is reminded that completion of courses in the broader, non-technical subjects which are integral to the standard college curriculum is an important part of his general preparation for responsible work in his chosen profession.

UNDERGRADUATE CERTIFICATE

Requirements

1. High school graduation. Students should file with the Graduate School, before completion of their certificate program, a transcript of their high school or college record.
2. Twenty-eight semester hours of credit with grades of "C" or better in courses as outlined below.

(a) Prerequisites: College algebra and trigonometry

(b) Required courses: (20 credits)

8-135. Elementary Surveying	(3)	8-222. Applied Mathematics for Cartographers	(2)
8-204. Topographic Surveying	(3)	8-223. Map Projections and Grid Systems	(3)
8-212. Photogrammetry I	(2)	8-240. Cartographic Techniques and Map Reproduction	(2)
8-213. Photogrammetry II	(2)		
8-208. Aerial Photographic Interpretation	(3)		

(c) Related Electives: At least eight hours of credit in courses selected from the related electives listed below.

ADVANCED CERTIFICATE

Requirements

1. High school graduation. Students should file with the Graduate School, before completion of their certificate program, a transcript of their high school or college record.
2. Thirty semester hours of credit with grades of "B" or better in courses as outlined below.
 - (a) Prerequisites: College algebra, trigonometry, analytic geometry, and calculus.
 - (b) Required courses: (22 credits)

8-217. Astronomy for En-	8-424. Large Scale Maps	(2)
gineers (3)	8-425. Small Scale Maps	(2)
8-218. Geodetic Surveying (3)	8-440. Elements of Geod-	
8-219. Computation and	esy	(6)
Adjustment of	2-226. Introduction to Of-	
Geodetic Observa-	ficial Writing	
tions (3)	or	
8-470. Photogrammetry III (2)	2-450. Technical Writing	(2)
8-471. Photogrammetry IV (2)		
 - (c) Related electives: At least eight hours of credit in courses selected from the related electives listed below.

Related Electives—for both the Undergraduate and Advanced Certificates

8-215. Route Surveying (3)	8-465. Applied Electronic	
8-408. Advanced Aerial	Theory	(4)
Photographic In-	2-226. Introduction to Of-	
terpretation (3)	ficial Writing(Un-	
8-203. General Geology (3)	dergraduate only)	(2)
8-205. Practical Geology (3)	5-360. General Oceanog-	
5-455. Elementary Photo-	raphy	(3)
geology (3)	5-326. General Meteorol-	
	ogy	(3)

Equivalent courses are accepted by transcript from other institutions to meet a part of the certificate requirements. Students who wish to use credit earned elsewhere should present the transcript to the Registrar at the beginning of their program.

—O—

Surveying

[8-135.] **Elementary Surveying** (1956-57 and every third year)

Fall, 3 credits

ERNEST J. PARKIN

[8-204.] **Ground Methods of Topographic Surveying** (1956-57 and every third year)

Spring, 3 credits

ERNEST J. PARKIN

[8-215.] **Route Surveying** (1957-58 and every third year)

Fall, 3 credits

ERNEST J. PARKIN

[8-217.] Astronomy for Engineers (1957-58 and every third year)

Spring, 3 credits

ERNEST J. PARKIN

8-218. Geodetic Surveying

Fall, 3 credits (every third year)

ERNEST J. PARKIN

Theory and practice of first- and second-order triangulation, traverse, leveling; use of base-line equipment, repeating and direction theodolites, geodetic leveling equipment; field computations necessary to insure accuracy of observations. *Prerequisite:* Elementary Surveying or permission of instructor.

8-219. Computation and Adjustment of Geodetic Observations

Spring, 3 credits (every third year)

ERNEST J. PARKIN

The office procedures in final computation and adjustment of field observations introduced in Course 218; least square approach to the adjustment of networks of traverse and leveling and simple triangulation figures. *Prerequisite:* Course 218 or equivalent or permission of instructor.

8-440. Elements of Geodesy

Year, 3 credits each semester (alternate years)

ROBERT L. MESSINGER

Introduction to geodesy from the geometric viewpoint (triangulation, geodetic astronomy) and from the physical viewpoint (potential theory, gravity). Determination of the figure of the earth, role of deflections of the vertical, and of gravity measurements; undulations of the geoid and the Stokes' functions; datum determination. The basic theories of isostasy. Mathematics is developed as needed. The aim of the course is to develop the student to the point where he will be able to appreciate the interrelations of the separate fields within geodesy and the manner in which they supplement one another in extending our knowledge of the earth. *Prerequisite:* College algebra and trigonometry.

*Photogrammetry***8-120. Introduction to Photogrammetry**

Fall, 2 credits

S. J. FRIEDMAN

Lectures and demonstrations in non-technical terms cover: the history and development of photogrammetric engineering; the importance of optics; basic principles of photography; types of aerial photography, aerial cameras, accessory equipment, and photographic aircraft; requirements of coverage, flight lines, tilt, and scale; photo interpretation and stereoscopes; requirements of horizontal and vertical control; radial plot and stereoscopic plotting instruments. Designed for persons who use aerial photographs in military planning and operations, highway development, agricultural land use and conservation, mineral and petroleum exploration, and in other engineering and industrial operations.

8-208. Aerial Photographic Interpretation

Fall, 3 credits

ETHAN D. CHURCHILL

Principles, techniques and applications of aerial photographic interpretation; history, concepts, types of aerial photographs, principles, techniques, and applications. Study, and use in various fields, of aerial photographs as a source of detailed natural and cultural information. *Prerequisite:* A general background in one of the following fields: surveying and mapping, cartography, geography, geology, forestry, agriculture, architecture, or allied engineering fields.

8-408. Advanced Aerial Photographic Interpretation

Spring, 3 credits (alternate years)

ETHAN D. CHURCHILL and SPECIALISTS

A seminar on the application of aerial photographic interpretation to specialized technical fields, such as forest, range, and wildlife management; agricultural soil, engineering soil and vegetation surveys; geology and petroleum geology; population census in rural and urban areas. *Prerequisite:* Basic training in aerial photographic interpretation or consent of instructor.

5-455. Elementary Photogeology

(See p. 50)

8-212. Photogrammetry I

Fall, 2 credits

W. S. HIGGINSON and G. C. TEWINKEL

Basic optics; basic geometric characteristics of aerial photographs; aerial cameras; camera mounts; basic photography and laboratory practices; photographic materials. *Prerequisite:* College trigonometry.

8-213. Photogrammetry II

Spring, 2 credits

W. S. HIGGINSON and G. C. TEWINKEL

Flight planning; aerial photographic specifications; radial line plotting methods; mosaics; determination of elevations from photographs; photo-interpretation. *Prerequisite:* College trigonometry.

8-470. Photogrammetry III

Fall, 2 credits (alternate years)

G. C. TEWINKEL and W. S. HIGGINSON

Geometry of the tilted photograph, the oblique, and the horizontal; introduction to tilt determination and analytic computations; study of multiplex equipment including projectors, support bars, electric circuits, tracing table; theory of multiplex, including interior and exterior orientation; multiplex practice. *Prerequisite:* Photogrammetry I and II.

8-471. Photogrammetry IV

Spring, 2 credits (alternate years)

G. C. TEWINKEL and W. S. HIGGINSON

Stereoscopic plotting instruments; rectification; the use of horizontal and oblique photographs; the photo alidade; continuation of multiplex theory and operational practice, including map control (horizontal, vertical and extension), planimetry and contours. *Prerequisite:* Photogrammetry III.

Cartography

8-125. Introduction to Cartography

Spring, 2 credits

WILLIAM A. FOSTER

The purpose of this course is to introduce the student to the broad field of cartography. This includes general instruction in the history of maps; the shape of the earth; the fundamental concepts of the most common projections; the basic principles of surveying, topography, hydrography, photogrammetry, oceanography and sketch mapping; the classification, evaluation, compilation, construction and revision of maps and charts; and the methods and techniques of reproduction. See also course 5-114, Maps and Charts, in the Department of Physical Sciences.

8-240. Cartographic Techniques and Map Reproduction

Spring, 2 credits

M. S. A. DELANEY and SPECIALISTS

Designed for persons engaged in the various phases of surveying and mapping. Covers modern media used in the preparation of the original and the original map copy itself for reproduction; the requirements of a good map/chart original; the advantages and disadvantages of photolithography, letter press, and gravure, including ozalid and photo-gelatin; color separation originals, negatives, and printing plates; combining half tones with the contour system. Provides the student with a broad working knowledge of the many steps involved in duplicating the map/chart original in black and white and multicolor work. Economy and precision in map-making is predicated on a knowledge of the process selected for reproduction.

[8-222.] Applied Mathematics for Cartographers (to be offered in 1956-57)

Fall, 2 credits

GEORGE H. EVERETT

8-223. Map Projections and Grid Systems

Spring, 3 credits

EDWARD W. FONFARA

Includes: basic principles with practical applications; computations; use of tables; layout; definitions; classifications; and characteristics. Identification of such standard projections as the polyconic, mercator, transverse mercator, Lambert conformal, gnomonic, and stereographic; and coordinate systems including rectangular, broad-area and true military grid.

This subject is presented from the practical viewpoint without the complex variable theory applications. *Prerequisite:* College trigonometry.

8-424. Large Scale Maps

Fall, 2 credits (alternate years)

JACOB SKOP

Includes a review of the fundamental principles of cartography and the application of these principles with emphasis on large scale maps. Specific topics include: types and scales of maps; classification of the earth's features and their interpretation in symbolization; names; drainage, relief, woodland and vegetation, and other cultural features; foreshore and offshore hydrography; public land surveys; methods and procedures for making large scale maps; pre-compilation preparation; aerial photography; horizontal and vertical control; classification surveys; the compiler and his work; compilation; editing and field checking; color separation drafting; photolithographic reproduction; and military grids. *Prerequisite:* Map Projections and Grid Systems, or equivalent.

8-425. Small Scale Maps

Spring, 2 credits (alternate years)

ROBERT M. MCREADY

Factors to be considered in selecting the projection for the map, the scale, and the material for the compilation; drawing the map and preparing it for reproduction; compilation, reproduction, and use of the Army Map Service series of maps: the Nautical Chart Series including their compilation, reproduction and application to navigation; the Aeronautical Chart Series including their compilation, reproduction, and application to air navigation. *Prerequisite:* Map Projections and Grid Systems, or equivalent.

FINE AND APPLIED ARTS

COMMITTEE

ROWLAND LYON (Chairman)

SADYE F. ADELSON
 MARTHA L. HENSLEY
 GARNETT JEX

O. A. DE LA ROSA
 HENRY A. MAGNUSON
 BEVERLEY ROBINSON

LEO G. WIEMER

*Fine Arts***8-60. Pencil Sketching and Water Color Painting**

Summer, non-credit

ROWLAND LYON

An informal class in theory and practice. Student may use either or both media. Class meets out-of-doors whenever possible.

8-320. Water Color Painting

Fall, 2 credits. Repeated in Spring

ROWLAND LYON

Theory and practice; painting from landscape and still life.

8-321. Pencil Sketching—Life Drawing

Fall, 2 credits. Repeated in Spring

DUANE A. McKENNA

A course of study and practice designed to give the student a thorough working knowledge of the human figure. Emphasis on personal observation and experience so the student may express a full understanding of the essential properties of motion, structure, and form. Drawing from the model and outdoor sketching included. Open to both beginners and advanced students.

8-323. Portrait Painting in Oil

Fall, 2 credits. Repeated in Spring

PIETRO LAZZARI

To enjoy this course the student need not have experience as an artist but must have the desire to achieve proficiency in portraiture.

Professional methods of painting oil portraits incorporating the basic techniques of the old masters and the spirit of modern art. Course includes, sketching, line composition and light arrangement; color, theory and technique of painting in oil. All work done from life.

8-330. The Grammar of Art: Drawing and Painting

Fall, 2 credits. Continued in Spring

B. COLIN GREENLY

A foundation course leading to an understanding and appreciation of the use of line, shape, tone, texture, and color in creative drawing and painting. Through personal supervision at the instructor's studio, the student is guided in the elementary practice of drawing and painting. The course is continued in the spring, for new students and for those who wish to go on from the fall semester.

8-331. The Grammar of Art: Sculpture

Fall, 2 credits. Continued in Spring

B. COLIN GREENLY

Using contemporary and traditional materials, the student is guided in the elementary practice of modeling and direct carving with emphasis on the principles of sculptural design. The course meets at the instructor's studio. The course is continued in the spring, for new students and for those who wish to go on from the fall semester.

8-333. Survey of Art

Fall, 2 credits

Instructor to be announced

The course is designed to establish the basic values which underlie artistic achievement and to develop an appreciation of these values before the objects themselves. From age to age these basic values—the aesthetic values—remain the same. The lectures will attempt to relate the major epochs to one another so as to indicate the continuity of art history and at the same time contrast the variant forces and ideas which produced such differing styles and expressions.

8-334. Modern Painters

Spring, 2 credits

Instructor to be announced

This course begins with a study of the art of the outstanding masters of the 17th Century and of the general current of painting in that century, with emphasis on the development of painting through the National Schools and styles up to the present moment. The main concern will be to arrive at an understanding and appreciation of impressionism and post-impressionism.

*Applied Arts***8-55. Introduction to Interior Decoration**

Fall, non-credit. Repeated in Spring

DOROTHY F. GEARHART

A non-credit course designed for persons who wish a non-professional knowledge of the principles of color and design to help them with their home-decorating problems. Topics discussed include discovering and using design, elements and principles of design, color and color systems.

**[8-65.] Modern Homemaking for Employed Men and Women
(1956-57 and alternate years)**

Spring, non-credit

LYDIA A. LYNDE

8-284. Principles of Landscape Design—Small Property

Fall, 2 credits

Instructor to be announced

An introduction to the fundamentals of landscape design with particular emphasis upon the design of small properties. Includes principles of orientation, arrangement and circulation.

8-285. Care of Ornamental Trees, Shrubs and Lawns

Spring, 2 credits

Instructor to be announced

A study of the principles and practices relating to site, planting, care and maintenance of ornamental trees and shrubs; care and maintenance of lawns and gardens.

PHOTOGRAPHY**COMMITTEE**

ELBRIDGE C. PURDY (Chairman)

JAMES A. BEALES

JULIUS HALSMAN

EDWARD S. COBB

R. J. LEFEBVRE

RAYMOND DAVIS

KEITH B. LEWIS

WILLIAM J. FORSYTHE

ALBERT R. MATERAZZI

FRED W. GERRETSON

CHARLES T. MYERS, JR.

HOWLAND PIKE

8-70. Popular Photography

Fall, non-credit. Repeated in Spring

WILLIAM C. MCHENRY

This is a lecture, demonstration course of a non-technical nature. It is intended particularly for those camera enthusiasts who desire a clearer understand-

ing of how their cameras, films and prints work. Better pictures should be the result of taking this course. Topics covered: camera types and operation; film types and uses; developing and printing; filters; exposure; planning, composition and lighting; portraiture; motion pictures; color photography. Exhibition and demonstration of equipment, materials and techniques supplement class lectures and discussion.

8-161. Lithography I—Camera

Fall, 4 credits. Repeated in Spring

RICHARD C. BALL

Basic information on the principles of lithography and operational procedures. Functions of equipment and explanation of the purpose or use of materials involved in camera work. Function of process cameras and lenses; purpose and uses of various films and darkroom processes; familiarization with fine-line requirements; function and purpose of color filters; halftone principles—optical screens; halftone principles—contact screens; outline of four-color process; purpose of dot-etching, masking, surprints, lateral reversal, etc. Lecture, demonstration, and practice. *Prerequisite:* One year's experience in a lithographic plant; or Fundamentals of Photography I; or the equivalent, subject to the approval of the instructor.

8-163. Lithography II

Fall, 3 credits. Repeated in Spring

JOSEPH F. HAMM

Continuation of Lithography I, providing advanced and refined study in the field of lithography. Preparation of art and copy; planning and layout; negative engraving and stripping; blueline method for color separation; imposition and register; vinyl plastics in lithography; color proofs on vinyl; chemistry of plate-making; comparison of various plate-making processes; plate-making techniques; formulas and procedures; offset papers and their uses; composition and application of offset inks and compounds; introduction to presswork; finishing procedures and equipment; latest techniques and materials in lithography; lithographic plant management. *Prerequisite:* Lithography I, or experience in a lithographic plant.

8-192. Fundamentals of Photography I

Fall, 2 credits. Repeated in Spring

EDWARD S. COBB

Forms a foundation for all of the more advanced courses in photography. Topics covered: nature of the photographic process; light as applied to photography; factors in development; developing solutions; exposure; lenses and image formation; photographic light and lighting; fixing and washing processes; and principles and use of filters.

8-193. Practice of Photography I

Fall, 2 credits. Repeated in Spring

JOHN O. BROSTRUP

This course furnishes laboratory practice and demonstration of the principles taught in Fundamentals of Photography I. It offers the student an opportunity to become familiar with recommended procedures and techniques. Topics covered: contact printing and processing; selection of printing papers; processing of negative roll film, cut film and film pack; diagnosis and remedy of processing defects; types of cameras, their operation and uses, and the application of filters. *Prerequisite:* Fundamentals of Photography I, or taken concurrently with Fundamentals of Photography I.

8-194. Salon Technique, Art and Composition

Fall, 2 credits. Repeated in Spring

MARTIN H. MILLER

Analysis and demonstration of the various pictorial elements necessary to successful picture making. Training the student to recognize and use such fac-

tors as mass, line, form, space, tone, perspective, and design to serve the picture purpose. How to dramatize the subject. Developing creative imagination.

8-195. Fundamentals of Photography II

Spring, 2 credits

WILLARD E. VARY

Subjects included: practical sensitometry and gradation control; the theory of projection printing; the nature of photographic light, its characteristics, control and measurement; shutter types and their performance; chemistry of photographic processes and the use of color film. *Prerequisite:* Fundamentals of Photography I.

8-196. Practice of Photography II

Spring, 2 credits

ELBRIDGE C. PURDY

Subjects included: application of sensitometric measurements, projection printing, print correction, composite printing, lighting, rendition of form and texture, light patterns, the effect of light on color, toning and print quality analysis. *Prerequisite:* Fundamentals of Photography I, Practice of Photography I, and Fundamentals of Photography II. May be taken concurrently with Fundamentals II.

8-270. Color Photography I—Monopack Color Printing

Fall, 3 credits (alternate years)

JOHN O. BROSTRUP

Theory and practice of making color prints on Ansco Printon. Lecture and supervised laboratory work covers in detail: principles of the Printon monopack color process, equipment, selection of transparency, contrast control masking, color compensation filters, exposure control methods and processing. *Prerequisite:* Fundamentals of Photography II and Practice of Photography II, or consent of instructor.

8-271. Color Photography II—Color Film Exposure and Processing

Spring, 3 credits (alternate years)

JOHN O. BROSTRUP

Theory and practice of exposure and processing color transparency films. Lecture and supervised laboratory work covers in detail: principles of monopack color films, equipment, color compensation filters, light balancing filters, and exposure of color films under studio and daylight conditions. Instruction covers esthetics of color composition, including arrangement, emphasis, choice of objects, camera and lighting techniques. Processing of color transparency films. *Prerequisite:* Color Photography I.

[8-272.] Color Photography III—Separation Negatives for Color Printing (1956-57 and alternate years)

Fall, 3 credits

JOHN O. BROSTRUP

[8-273.] Color Photography IV—Dye Transfer Color Printing (1956-57 and alternate years)

Spring, 3 credits

JOHN O. BROSTRUP

8-360. Portrait Photography

Year, 2 credits each semester

ELBRIDGE C. PURDY

A studio and darkroom course that provides opportunity for practice. The student learns through individual guidance the subtleties of fine portrait work. Lighting, posing, composition, processing and re-touching. *Prerequisite:* Practice of Photography II.

8-011. Photographic Roundtable

Year, non-credit

ELBRIDGE C. PURDY, Advisor

The Roundtable has been formed to provide opportunity for the continued study of photography. The group meets twice each month during the regular school year. One meeting is devoted to constructive analysis of photographic work presented by members; the other meeting is devoted to presentation of information about new developments and techniques in photography and to other topics of current interest. The Roundtable sponsors an Annual Salon.

Registration is open to persons who have completed any of the courses in photography offered by the Graduate School. Registration is required, and there is a small registration fee.

Courses Offered at the National Institutes of Health

ADVISORY COMMITTEES

Natural Sciences

DANIEL STEINBERG (Chairman)
ROBERT BERLINER
SEYMOUR S. KETY
CHRISTIAN B. ANFINSEN
ALAN H. MEHLER
BERNARD L. HORECKER

HOWARD L. ANDREWS
JOHN C. LILLY
HEWITT G. FLETCHER
ROGER M. COLE
JUSTIN M. ANDREWS
DAVID SHAKOW

MURRAY C. BROWN

Humanities

LEALON E. MARTIN (Chairman)
ERICH MOSETTIG
SCOTT ADAMS

ALBERT DALTON
RALPH D. LILLIE
MURRAY C. BROWN

Public Administration

GLEN WILBUR (Chairman)
RICHARD HENSCHER
ZELDA SCHIFFMAN
ROBERT LEARMOUTH

ESTHER DEEL
ROBERT GRANT
RONALD SCANTLEBURY
MURRAY C. BROWN

In the fall semester, 1954, the National Institutes of Health invited the Graduate School to offer a program of courses at the Bethesda Center which would be designed to meet the particular needs of the employees of that center. The courses listed below are tentatively scheduled to be offered during 1955-56. A detailed time schedule, showing the complete and final program, will be issued in August. All of the classes meet at the National Institutes of Health in Bethesda, and are open to all Government employees and to the general public. Registration may be completed at the National Institutes of Health or at the Graduate School.

BIOLOGY AND MEDICINE

1-250. Introductory and General Bacteriology

Year, 2 credits each semester

NORMAN McCULLOUGH

Introductory and general bacteriology developed historically. Includes specific handling of major groups of bacteria and techniques employed in bacteriology. No prerequisite.

1-305. History of Medicine

Fall, 2 credits

MORRIS C. LEIKIND

The growth of medicine and allied sciences from antiquity to modern times. The rise of the experimental method as applied to the medical sciences, and the development of laboratories and research institutes. Lectures, illustrated by lantern slides and demonstrations of medico-historical objects and books from the Medical Museum of the Armed Forces Institute of Pathology and the Armed Forces Medical Library. No prerequisite.

1-345. Elementary and Biochemical Genetics

Fall, 1 credit

BRUCE AMES and BARBARA WRIGHT

The first half of the course deals with genetic phenomena in various microorganisms, and includes such topics as the genetics of *Neurospora* and transforming factors in bacteria. The latter half of the course covers the theory and practice of use of microbial mutants in investigating biochemical systems, as well as the biochemistry of some genetically controlled diseases in higher animals. *Prerequisite*: General biology and biochemistry.

1-422. Human Physiology

Fall, 3 credits

A. V. WOLF

A course in the physiology of health and disease, consisting of lectures, lecture-conferences, and demonstrations. Emphasis is on function in muscle, peripheral nerve, special senses, central and autonomic nervous systems, heart and circulation, respiration, kidney, water and electrolyte balance, temperature regulation, thirst, digestive system, and basal metabolism. *Prerequisite*: One year of undergraduate biology, chemistry, and physics.

1-455. Cellular Physiology

Year, 2 credits each semester

A. M. SHANES

General chemistry and morphology of the cell. Bioelectrical phenomena and their origin. Permeability, diffusion, and active transport. Excitability phenomena and drug action. Contractility. *Prerequisite*: General college physics, chemistry and biology.

1-645. Sensory Physiology

Fall, 2 credits

JOHN R. HUGHES

The physiological bases of sensory processes, with emphasis on the neurophysiological aspects of audition and vision. An attempt to correlate relevant facts on end organ structure, neuroanatomical pathways, and experiments in physiological psychology and neurophysiology. *Prerequisite*: Bachelor's degree with working knowledge of physiology, or consent of the instructor.

1-710. Clinical Neuroanatomy—Brain Model

Fall, 2 or 4 credits

ELLSWORTH C. ALVORD, JR.

A combination lecture and laboratory class, with the laboratory optional for the four credits. Lecture: the embryologic and phylogenetic development of the nervous system, with its segmental and suprasegmental portions and their interconnections. Emphasis on the anatomic foundations of clinical neurology and experimental neurophysiology. Laboratory: construction of a model of the human brain, following the outline of the development of the nervous system. *Prerequisite*: Bachelor's degree (pre-medical equivalent) and consent of the instructor.

CHEMISTRY**5-248. Organic Chemistry**

Year, 3 credits each semester

JAMES W. PRATT

A systematic study of the fundamental chemistry of the compounds of carbon. Individual compounds of special interest, classes of compounds, and general theoretical considerations. The first semester is concerned with aliphatic compounds, the commoner functional groups, and various types of isomerism. The second semester consists principally of aromatic chemistry. *Prerequisite*: General inorganic chemistry or consent of the instructor.

5-348. Survey of Physical Chemistry

Year, 3 credits each semester

MERRILL WALLENSTEIN

Review of fundamental principles of thermodynamics, reaction kinetics, and allied fields from the standpoint of molecular structure and the interaction of molecules. Special attention to topics of more immediate interest in biology such as membrane equilibria, behavior of macromolecules, and solutions of electrolytes. *Prerequisite:* Calculus and chemistry through quantitative analysis.

5-417. Chromatography

Fall, 2 credits

ERICH HEFTMANN

Discussion of principles and application of adsorption chromatography, partition chromatography, and ion exchange chromatography. *Prerequisite:* College Chemistry.

5-648. Protein Chemistry

Fall, 3 credits

HENRY A. SAROFF

Preparation and properties of proteins; protein solubility; characterization and analysis; titration data and interpretation; the binding of neutral and charged molecules. Size, shape, and structure determinations; degradation and modification reactions. *Prerequisite:* B.S. in Chemistry. A working knowledge of physical chemistry, preferably one graduate course.

5-719. Enzyme Chemistry

Year, 2 credits each semester

ALAN H. MEHLER

Present concepts of the nature of enzymes and the mechanisms of biological catalysis, presented as appropriate examples are met in a systematic survey of enzymes. Current developments, with emphasis on experimental methods. *Prerequisite:* General biochemistry, or organic and physical chemistry.

COMMUNICATIONS*English and Speech***2-224. Readable Writing** (See p. 19)**2-229. Public Speaking** (See p. 24)**2-450. Technical Writing** (See p. 20)**2-455. Organization of Scientific Information**

Fall, 2 credits

SCOTT ADAMS and ASSOCIATES

Discussion of communication problems arising from the accelerated production of scientific and technical literature. The role of conventional techniques: libraries, abstracting and indexing services; proposed information systems based on contemporary instrumentation, and the adaptability of such systems to personal files.

*Foreign Languages***2-48. Scientific French**

Fall, non-credit

Instructor to be announced

Reading and translation of current scientific and technical material. Review of grammar, vocabulary building. For persons with some knowledge of French who wish to improve it for professional purposes.

2-49. Basic Scientific and Medical Russian

Fall, non-credit

ALEXIS SHELOKOV

Introduction to the written Russian language with emphasis on writings in the biological, medical, and related fields. Fundamentals of grammar and syntax combined with readings in simpler texts, progressing to individual assignments in the current Soviet journals in the students' fields of interest.

2-60. Scientific German

Fall, non-credit

ERICH MOSETTIG

Designed to give the student a reading knowledge of German scientific literature in the fields of chemistry, physics, biology, and medicine. *Prerequisite:* One to two years of high school or college German, or equivalent knowledge of German grammar.

2-300. Elementary Spanish

(See p. 28)

MATHEMATICS AND STATISTICS

3-126. Introductory Statistics

(See p. 35)

3-165. Survey of Biomathematics

Year, 2 credits each semester

SAMUEL W. GREENHOUSE

A broad survey limited to the mathematics particularly applicable to biological problems with emphasis on the useful rather than theory. Text: Feldman's *Biomathematics*. The course begins with logarithms and trigonometry and proceeds over the year to the elements of differentiation and integration and the elements of differential equations. *Prerequisite:* Elements of algebra and plane geometry.

3-406. Introduction to Experimental Statistics

Year, 2 credits each semester

JEROME CORNFELD

Some of the fundamental bases of statistical analysis, followed by consideration of the tests of significance most generally useful in the analysis of biological experiments. Includes the usual tests of significance, confidence limits, analysis of variance, curve fitting, and bioassay. *Prerequisite:* Bachelor's Degree.

3-436. Questionnaire Construction and Interviewing

Fall, 2 credits

HYMAN GOLDSTEIN

Techniques for data collection in sample and census surveys; defining the issues; constructing the dummy tables; the pretest; question types; probes; scaling methods; projective techniques; depth interviewing; the focussed interview; interviewing practices; training interviewers; refusals; interviewer competence. *Prerequisite:* Principles of statistical analysis, or equivalent, and a background in the social sciences.

*Public Administration***4-116. Federal Budgetary Procedure**

(See p. 43)

4-117. Records Management Procedure

(See p. 43)

6-344. Introduction to Public Administration

(See p. 61)

- 6-352. **Principles of Accounting** (See p. 61)
- 6-405. **Principles and Techniques of O&M Work** (See p. 70)
- 6-430. **Public Personnel Administration** (See p. 65)

General

7-85. Investments

Fall, non-credit

MAXWELL KAUFMAN

Types of investments; stocks, bonds—corporate, government, etc., mortgages, real estate, insurance, building and loan, credit unions. The function and operation of the stock and commodity exchange. Analysis of corporate reports. Predicting outlook for various industries.

Correspondence Program

COMMITTEE

E. J. PETERSON (Chairman)

LOUISE O. BERCAW
MARY L. COLLINGS
C. EDWIN DAVIS
WILLIAM A. DEVAUGHAN
E. R. DRAHEIM
CANNON C. HEARNE

HANS S. HOIBERG
JAMES L. ROBINSON
JAMES H. STARKEY
GALEN YATES
GEORGE A. YOUNG

The following courses are open to qualified field employees of the Federal Government and to others as facilities permit. Persons who wish further information or who wish to register in one of the courses should write to the Registrar, U. S. Department of Agriculture Graduate School, Washington 25, D. C.

114C. Federal Personnel Procedure

2 credits (16 lessons)

VERNA C. MOHAGEN

A course in basic practices and procedures designed to accomplish appointment, transfer, promotion, demotion, separation, and retirement of Federal employees. The course has three objectives: (1) to keep abreast of current developments in personnel procedures; (2) to become familiar with the legal and administrative background of such procedures (statutes, executive orders, decisions of the Comptroller General, the Civil Service Commission, Administrative Orders, etc.); and (3) to visualize the constant need for streamlining procedures in the interests of simplicity and efficiency. *Cost:* \$20 plus \$7.50 supplies and postage.

125C. Basic Lettering

1 credit (7 lessons)

EUGENE MAY

Designed to familiarize the student with the fundamentals of lettering with applications to soil survey charts and maps. Topics covered are basic strokes, spacing, use of the contour pen, and lettering of symbols on aerial photographs. *Cost:* \$10 plus \$5 supplies and postage fee (does not include lettering tools).

201C. Administration and Supervision—Basic Principles and Practices

2 credits (16 lessons)

GEORGE A. YOUNG

Designed for persons who direct activities of a group of employees, regardless of number, and for those who desire to become qualified to handle supervisory and administrative responsibilities. Basic management principles. Application of these principles in relation to the most effective managerial practices. Consideration of the most prevalent administrative and supervisory deficiencies, their causes and remedies. Assists the student to prepare to serve effectively as the administrative head of an organizational unit. *Cost:* \$20 plus \$5 supplies and postage fee. Text is recommended but not required.

236C. Report Writing

2 credits (15 lessons)

JAMES PICKENS

A practical course designed to aid members of the field forces in preparing memoranda and reports to administrative heads. The fundamentals of English composition are briefly and simply treated, and special attention is given to clear, concise, orderly, informative presentation and to avoiding the more common faults of expression. *Cost:* \$20 plus \$5 supplies and postage fee, plus the text.

316C. Soils and Soil Management

2 credits (15 lessons)

J. GORDON STEELE

Practical aspects of soil management. Physical, chemical, and biological properties of soils. How soils are formed. Soils of different places. How soils are changed by erosion, depletion, and improvement. Management of soils for good production and for their conservation and improvement. *Prerequisite:* Chemistry equivalent to that covered in high school. Students who lack a background of at least high-school chemistry should expect to do extra reading. Preparation in physics is helpful but not essential. *Cost:* \$20 plus \$5 supplies and postage fee, plus text.

321C. Farm Forestry

2 credits (15 lessons)

JOHN F. PRESTON

A course in the growing of wood as a farm crop. Principles of forestry as integrated with the farm business, and as contrasted with commercial forestry. The management of woods on the farm; development of a farm woodland enterprise. Designed to assist those who teach agriculture or assist farmers in its practice, professional foresters, and farmers to apply forestry techniques to the special problems of growing wood as a farm crop. Students should have access to a farm woodlot since some of the lessons require actual observation. *Cost:* \$20 plus \$5 supplies and postage fee, plus text.

325C. Legal Aspects of Investigations—Criminal Evidence and Procedure

2 credits (16 lessons)

JAMES D. FORBES

Designed to provide investigative personnel and those desiring to prepare for such work, a background and insight into the legal aspects of their investigations: what types of evidence to seek; circumstances and conditions under which the evidence is to be obtained in order to have adequate probative value; and how to prepare such evidence for presentation in court or other procedure. Since all investigations are potential sources of prosecution, the requirements of criminal evidence and procedure often reach into the early stages of investigation. The instruction is designed to provide understandable information without overemphasis of technical aspects. *Prerequisite:* Experience in some type of investigative work. *Cost:* \$20 plus \$7 supplies and postage fee.

362C. Federal Meat Inspection and Animal Quarantine Laws

2 credits (16 lessons)

LOWELL MILLER

A study of the history, constitutionality, and provisions of the Federal Meat Inspection Act and related legislation, and the Animal Quarantine statutes, with particular reference to the law of search and seizure, affidavits, hearsay and other rules of evidence. The course is intended as an aid to administrative officials. No previous legal training is required. *Cost:* \$20 and \$5 supplies and postage fee.

410C. Safety Program Administration (To be ready about January, 1956)

2 credits (16 lessons)

SETH JACKSON

513C. Statistical Methods in Biology and Agriculture

2 credits (15 lessons)

JACOB LIEBERMAN and ASSOCIATES

This course uses Snedecor's textbook "Statistical Methods," and follows its outline largely but not absolutely. Each of the 15 lessons consists of narrative material, textbook assignments, questions, and problems. The reports are re-

turned with corrections and comments. Subjects discussed include simple variation, regression and correlation, analysis of variance and covariance, chi-square, multiple and curvilinear correlation, applications to sampling and experimental design. Practical application of methods is kept to the front. Facility in the use of arithmetic and simple algebra is necessary. *Cost:* \$20 plus \$5 supplies and postage fee, plus text.

515C. Statistics of Biological Assay

2 credits (15 lessons)

F. M. WADLEY

General principles. Specialized methods which have been developed for planning and analyzing experiments. Graded and all-or-none responses. Estimates of potency. Comparisons of materials. Joint action, variances, and other phases. *Prerequisite:* A course similar to Statistical Methods in Biology and Agriculture. *Cost:* \$20 plus \$5 supplies and postage fee, plus text.

521C. Sampling and Experimental Design

2 credits (16 lessons)

F. M. WADLEY

Students enrolling in this course should have a genuine practical interest in experimentation, and some facility in statistical calculations, including analysis of variance as shown by texts like Snedecor's or Goulde's. The course is intended to give the student an introduction to basic concepts, some practice in applying them, and some acquaintance with the literature opening the way to further study. The philosophy and fundamentals are first treated, with some attention to elementary sampling principles. Next are presented lessons on simpler practical designs, as to use and analysis of results. Last come lessons on factorial design, confounding and more complex experiments, including incomplete block designs. "Experimental Designs," by Cochran and Cox, is used as a text, with some supplementary discussion. *Cost:* \$20 plus \$5 supplies and postage fee, plus text.

533C. Hydrology I

3 credits (16 lessons)

MAX A. KOHLER and ASSOCIATES

Review of elementary hydraulic principles basic to a study of flow in natural channels. The phenomena of meteorology which control climate. Methods of collecting data essential to hydrology. The physical characteristics of the land which control the disposition and movement of the earth's water. *Prerequisite:* Physics and algebra. Elementary meteorology, statistics, and engineering are desirable, but not required. *Cost:* \$25 plus \$5 supplies and postage fee, plus text.

534C. Hydrology II

3 credits (16 lessons)

MAX A. KOHLER and ASSOCIATES

The tools used by the hydrologist and the application of these tools to specific problems. Hydrograph analysis, runoff relations, runoff distribution, waves, streamflow routing. Special techniques required in the design of projects. Design and operation of water control works. Small basin problems. River forecasting. *Prerequisite:* Hydrology I or an equivalent course. *Cost:* \$25 plus \$5 supplies and postage fee. Text used in Hydrology I is used also in this course.

580C. Social and Economic History of Agriculture

2 credits (15 lessons)

WAYNE D. RASMUSSEN

Introduction; the geographical basis; indigenous and foreign contributions; agrarian colonization and settlement; land policies; agricultural development by periods, regions, and commodities; farm implements and machinery; labor; tenancy; financing farming operations; transportation and marketing of agricultural products; migration of industries from farm to factory; farmers political movements; agencies promoting agriculture, including individual leadership, societies, fairs, periodicals, State and Federal departments, education, and sciences; agriculture in the life of the Nation. *Cost:* \$20 plus \$9 supplies and postage fee.

Faculty

FACULTY, DEPARTMENTAL AND SPECIAL COMMITTEES

The year following the name represents the first year of association
with the Graduate School.

- ACKER, LAURENCE W., (1948). Deputy Chief, Army Audit Agency, Department of the Army. Taught at Columbus School of Accounting and Tyler Commercial College. (Public Administration)
- ACKERMAN, CLARA B., (1950). M.A., George Washington. Formerly Editor, Extension Service Review, Federal Extension Service, USDA. (Committee on Information)
- ADAMS, SCOTT, (1954). A.B., Yale; B.L.S., Columbia. Librarian, National Institutes of Health, Department of Health, Education, and Welfare. (NIH)
- ADELSON, SADYE F., (1949). M.A., California. Nutrition Analyst, Human Nutrition Research Branch, Agricultural Research Service, USDA. (Technology)
- AITON, EDWARD W., (1953). M.S., Minnesota. Director, Four-H Club and YMW Programs, Federal Extension Service, USDA. (Social Sciences)
- ALLIN, BUSHROD W., (1939). Ph.D., Wisconsin. Chairman, Outlook and Situation Board, Agricultural Marketing Service, USDA. Taught at Wisconsin. (Social Sciences)
- ALVORD, ELLSWORTH C., JR., (1955). M.D., Cornell. Chief, Section of Clinical Neuropathology, National Institute of Neurological Diseases and Blindness, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Cornell, George Washington, Georgetown, and Washington School of Psychiatry. (NIH)
- AMES, BRUCE, (1955). Ph.D., California Institute of Technology. Assistant Scientist, National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Department of Health, Education, and Welfare. (NIH)
- ANDREWS, HOWARD L., (1954). Chief, General Radiobiology Section, National Cancer Institute, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Brown. (NIH)
- ANDREWS, JUSTIN M., (1954). D.Sc., Johns Hopkins. Associate Chief, Bureau of State Services, Public Health Service, Department of Health, Education, and Welfare. Taught at Johns Hopkins, Emory University Medical School, and University of the Philippines. (NIH)
- ANFINSSEN, CHRISTIAN B., (1954). Ph.D., Harvard. Chief, Laboratory of Cellular Physiology and Metabolism, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Harvard. (NIH)
- APPLEMAN, PAUL L., (1946). Occupational Specialist, Bureau of Programs and Standards, Civil Service Commission. (Public Administration)
- ARMSTRONG, LANCELOT W., (1955). Assistant Chief, Electronic Systems Branch, U. S. Bureau of the Census, Department of Commerce. (Mathematics and Statistics)
- ARNOLD, OLGA MOORE, (1954). B.A., Wyoming. Information Specialist, U. S. Information Agency. (Languages and Literature)
- ASKEGAARD, DAVID, (1950). B.S., North Dakota. Head, Operations Section 8, Southwest Area, Rural Electrification Administration, USDA. (Technology)
- AYLESWORTH, PHILIP F., (1949). M.S., Purdue. Assistant to the Administrator, Federal Extension Service, USDA. (Social Sciences)
- BACHMAN, KENNETH L., (1950). Ph.D., Harvard. Acting Head, Production Income and Cost Section, Production Economics Research Branch, Agricultural Research Service, USDA. (Social Sciences)
- BAHN, CATHERINE I., (1953). M.A., Columbia. Cartographer, Research Library Branch, Aeronautical Chart and Information Center, Department of the Air Force. (Languages and Literature; Physical Sciences)
- BAKER, GLADYS L., (1945). Ph.D., Chicago. Agricultural Historian, Agricultural Marketing Service, USDA. (Public Administration)
- BALDAUF, TONY M., (1951). Head, Procurement Management Section, Office of Budget and Finance, USDA. (Office Techniques)
- BALL, RICHARD C., (1950). Photo-lithographer Supervisor, Office of Plant and Operations, USDA. Formerly Dean of Instruction, Photo-Tech Institute, Salt Lake City. (Technology)
- BAMFORD, RONALD, (1949). Ph.D., Columbia. Dean of Graduate School, University of Maryland. (Biological Sciences)
- BARGIN, GERMAINE, (1954). Diplôme, Université de Paris and de l'Institut d'Amérique Latine de Mexico. Lecturer in French, Catholic University. (Languages and Literature)
- BARNES, CARL B., (1955). Head, Recruitment and Placement Section, Office of Personnel, USDA. (Committee on Internship Cooperation)
- BARNES, CARLETON P., (1954). Ph.D., Clark. Research Coordinator, Agricultural Research Service, USDA. (Physical Sciences)
- BARTLETT, L. GEORGE, (1947). C.P.A., B.C.S., Southeastern. Reviewing Examiner, Examination Division, Farm Credit Administration. (Committee on Internal Audit)
- BATES, C. C., (1955). Ph.D., Texas A & M. Deputy Director, Division of Oceanography, Hydrographic Office, Department of the Navy. (Physical Sciences)

- BAUER, MAGNA E., (1943). Auguste Victoria Lyzeum, Berlin. Chief of Research Section, Foreign Studies Branch, Office of the Chief of Military History, Department of the Army. (Languages and Literature)
- BEALES, JAMES A. (1948). Chief, Photographic Section, Facilities Branch, U. S. Information Agency. (Technology)
- BEAR, N. ROBERT, (1948). B.S., Ohio State. Chief, Division of Organization and Personnel Management, Office of Personnel, USDA. Taught at Ohio State and Michigan State. (Public Administration)
- BEARDSLEY, KATHERINE PEASE, (1953). Ph.D., Columbia. Lecturer, American University. Department of Psychology, Mount Vernon Junior College. Taught at Briarcliff Junior College, Finch Junior College, and Columbia. (Social Sciences)
- BEAUCHAMP, GEORGE E., (1944). Ph.D., Northwestern. Taught at Manchester College, Northwestern, and Nottingham. (Languages and Literature)
- BECK, ROY S., (1953). Ph.D., Cornell. Marketing Specialist, Dairy Division, Agricultural Marketing Service, USDA. (Social Sciences)
- BECKNELL, HARVEY E., (1949). M.A., Columbia. Chief, Division of Training and Utilization, Office of Personnel Administration, Department of Labor. (Public Administration)
- BELL, E. DONALD, (1951). Office of Assistant Vice-President for Labor Relations, Southern Railway System. (Office Techniques)
- BENNEWITZ, ECKHARD, (1952). A.B., Cincinnati. Office of Defense Comptroller for Europe. Taught at George Washington and American. (Public Administration)
- BENTON, MILDRED C., (1950). A.B. in L.S., George Washington. Consultant in Research Information, Naval Research Laboratory. (Physical Sciences)
- BERCAW, LOUISE O., (1949). Assistant Director of the Library, USDA. (Committee on Correspondence Study and Extension Education)
- BERLINER, ROBERT, (1955). M.D., Columbia. Associate Director in Charge, National Heart Institute, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Columbia, George Washington, and New York. (NIH)
- BERLINSKY, STANLEY L., (1954). Ph.D., Michigan. Private Practice, Speech Correction. Taught at Michigan. (Languages and Literature)
- BIERMAN, RUSSELL W., (1953). Ph.D., Harvard. Agricultural Economist, Agricultural Research Service, USDA. (Social Sciences)
- BIGMAN, STANLEY K., (1955). M.A., Columbia. Project Director, Bureau of Social Science Research, American University. Taught at Rutgers, Columbia, and American. (Social Sciences)
- BLICKENSDEFFER, J. P., (1949). Ph.D., Harvard. Editor, U. S. Quarterly Book Review, Library of Congress. Taught at Oklahoma, Washington, Harvard, and Pittsburgh. (Languages and Literature)
- BOLLO, LOUISE E., (1952). A.B., George Washington. Nosologist, Public Health Service, Department of Health, Education and Welfare. (Biological Sciences)
- BONNIWELL, MARION E., (1954). A.B., William and Mary. Librarian, Bureau of Ships, Department of the Navy. Taught at Maryland. (Languages and Literature)
- BOTTS, RALPH R., (1946). B.S., Florida. Agricultural Economist, Production Economics Research Branch, Agricultural Research Service, USDA. (Office Techniques; Public Administration; Social Sciences)
- BOYD, LUCILE N., (1954). Training Officer, Internal Revenue Service, Department of the Treasury. Taught at Chillicothe Business College, Missouri. (Office Techniques)
- BRASFIELD, KARNEY A., (1952). C.P.A., B.S., Washington University in St. Louis. Deputy Director, Accounting Systems Division, General Accounting Office. (Public Administration)
- BREWSTER, JOHN M., (1949). Ph.D., Columbia. Agricultural Economist, Agricultural Marketing Service, USDA. Taught at Columbia. (Social Sciences)
- BRIGHAM, GORDON D., (1954). M.A., Western Reserve. Captain, USAF, Directorate of Legislative Liaison. Taught at Maryland, American, and Pennsylvania State. (Languages and Literature)
- BROSTRUP, JOHN O., (1955). Assistant Chief, Photography Division, Armed Forces Institute of Pathology. (Technology)
- BROWN, A. L., (1954). M.S., Howard. Oceanographer, Hydrographic Office, Department of the Navy. Taught at Howard. (Physical Sciences)
- BROWN, MURRAY C., (1954). M.D., Virginia. Chief, Clinical and Professional Education, National Institutes of Health, Department of Health, Education, and Welfare. (NIH)
- BUCKLEY, JAMES L., (1941). LL.B., Georgetown. Assistant Director of Personnel, USDA. (Public Administration)
- BURKHART, M. D., (1955). M.S., Pennsylvania State. Oceanographer, Hydrographic Office, Department of the Navy. (Physical Sciences)
- BURROUGHS, ROY J., (1947). Ph.D., Michigan. International Housing Finance Adviser, Housing and Home Finance Agency. Taught at Michigan, Port Huron Junior College, and Michigan State. (Social Sciences)
- BURROWS, GLENN L., (1952). M.A., Michigan State. Statistical Consultant, Agricultural Marketing Service, USDA. Taught at Wayne, William and Mary, and Michigan State. (Mathematics and Statistics)
- BUTLER, FRANCES A., (1952). Director of Business and Secretarial School, Emerson Institute. Taught at Temple Secretarial School. (Office Techniques)
- BUTLER, K. A., (1949). B.S., Minnesota. Director of Program Appraisal and Internal Audit, Agricultural Research Service, USDA. (Public Administration)
- CALLAN, J. A. C., (1949). M.A., M.C.E., Union. Research Engineer, Engineer Research and Development Laboratory, Department of the Army. Taught at Union and Alabama Polytechnic. (Technology)

- CANNON, EDWARD W., (1948). Ph.D., Johns Hopkins. Chief, Applied Mathematics Division, National Bureau of Standards, Department of Commerce. Taught at Johns Hopkins, Delaware, and American. (Mathematics and Statistics)
- CARLIN, ALBERT V., (1951). B.S., Boston. Chief of Training, U. S. Weather Bureau, Department of Commerce. (Physical Sciences)
- CARLSON, THEODORA E., (1952). A.B., Nebraska. Economic Editor, Foreign Agricultural Service, USDA. (Committee on Publications)
- CAVIN, JAMES P., (1938). Ph.D., Harvard. Chief, Statistical and Historical Research Branch, Agricultural Economics Division, Agricultural Marketing Service, USDA. Taught at Catholic and Puerto Rico. (Social Sciences)
- CHENEY, JOHN T., (1952). M.A., California. Chief, Literature Division, Public Library, District of Columbia. (Languages and Literature)
- CHURCHILL, ETHAN D., (1950). Ph.D., Catholic. Consulting Ecologist. Intelligence and Systems Analyst. (Technology)
- CLEMENTS, FORREST E., (1949). Ph.D., California. Consultant, Steward, Dougall and Associates, Inc. Taught at California, Yale and Oklahoma. (Social Sciences)
- COBB, EDWARD S., (1947). Head, Specifications and Tests, Naval Photographic Center, Department of the Navy. (Technology)
- COCHRAN, WILLIAM G., (1946). M.A., Cambridge. Professor of Biostatistics, Johns Hopkins University. Taught at Iowa State and North Carolina. (Mathematics and Statistics)
- COLE, ROGER M., (1954). Ph.D., Harvard; M.D., Boston University. Chief, Rheumatic Fever Unit, National Microbiological Institute, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Harvard and Georgetown. (NIH)
- COLLINGS, MARY LOUISE, (1952). M.A., Northwestern. Chief, Personnel Training Branch, Division of Extension Research and Training, Federal Extension Service, USDA. (Social Sciences; Committee on Correspondence Study and Extension Education)
- COLLINS, EMMETT B., (1946). B.B.A., Emory. Chief, Division of Budgetary and Financial Reports, Office of Budget and Finance, USDA. (Office Techniques)
- COMPTON, LAWRENCE V., (1952). M.A., California. Head Biologist, Soil Conservation Service, USDA. (Biological Sciences)
- COOK, RICHARD F., (1955). A.B., National. C.P.A., Assistant Director for Administration, United States Information Agency. Taught at Catholic and Strayer. (Public Administration)
- COOPER, JOHN C., (1946). A.B., Furman. Deputy Director, Office of Budget and Finance, USDA. (Public Administration)
- CORNFIELD, JEROME, (1940). B.S., New York. Mathematical Statistician, Office of Biometry, National Institutes of Health, Department of Health, Education, and Welfare. (NIH)
- CORNSWEET, ALBERT C., (1947). Ph.D., North Carolina. Chief, Clinical Psychologist, Mental Hygiene Clinic, Washington Regional Office, Veterans Administration. Professorial Lecturer at American University. Taught at Brown and North Carolina. (Social Sciences)
- COWING, AMY G., (1947). B.A., B.Ed., George Washington. Extension Analyst, Division of Extension Research and Training, Federal Extension Service, USDA. (Languages and Literature)
- CURRIER, L. W., (1947). Ph.D., Syracuse. Geologist, U. S. Geological Survey, Department of the Interior. Taught at Idaho, Northwestern, Massachusetts Institute of Technology, Syracuse, Missouri School of Mines. (Physical Sciences)
- DAFT, FLOYD S., (1954). Ph.D., Yale. Director, National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Department of Health, Education and Welfare. (Biological Sciences)
- DALTON, ALBERT, (1954). Ph.D., Harvard. Psychologist, National Cancer Institute, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Harvard, City College of the City of New York, Western Reserve, McGill, and Johns Hopkins. (NIH)
- DALY, JOSEPH F., (1941). Ph.D., Princeton. Chief Mathematical Statistician, Bureau of the Census, Department of Commerce. Taught at Princeton and Catholic University. (Mathematics and Statistics)
- DAVIDOW, BERNARD, (1951). Ph.D., Georgetown. Pharmacologist, Food and Drug Administration, Department of Health, Education and Welfare. (Physical Sciences)
- DAVIS, C. EDWIN, (1954). M.A., Texas. Assistant Director, Personnel Division, Farmers Home Administration, USDA. (Committee on Correspondence Study and Extension Education)
- DAVIS, FLOYD E., (1950). M.S., Ohio State. Chief, Livestock and Livestock Products and Poultry Branch, Office of Food and Agriculture, Foreign Operations Administration. (Social Sciences)
- DAVIS, RAYMOND, (1946). Chief, Photographic Technologist Section, National Bureau of Standards, Department of Commerce. (Technology)
- DEEL, ESTHER, (1954). B.S., Winthrop. Administrative Assistant to Associate Director for Extramural Programs, National Institutes of Health, Department of Health, Education, and Welfare. (NIH)
- DELANEY, MAURICE S. A., (1948). Technical Assistant to the Director, Division of Chart Construction, Hydrographic Office, Department of the Navy. (Technology)
- DE LA ROSA, O. A., (1953). M.S., Catholic. Architect, Engineering and Architectural Design Branch, Bureau of Yards and Docks, Department of the Navy. (Technology)
- DELL'ARIA, PAUL S., (1954). B.C.E., City College of the City of New York. Engineer, David Taylor Model Basin, Department of the Navy. Past President, D. C. Society of Engineers. (Technology)
- DE VAUGHAN, WILLIAM A., (1954). Chief, Employee Development and Safety Branch, Personnel Division, Agricultural Research Service, USDA. (Committee on Correspondence Study and Extension Education)

- DEVRIES, P. H., (1949). M.A., Michigan. Assistant Director for Price Support, Information Division, Commodity Stabilization Service, USDA. Taught at Michigan State. (Committee on Publications)
- DEXTER, WAYNE V., (1950). B.S., Kansas State College. Publications Editor (Agricultural and Biological Sciences), Office of the Administrator, Agricultural Marketing Service, USDA. (Committee on Information)
- DIX, WALTER S., (1952). Civil Engineer, Tennessee Valley Authority. (Technology)
- DOLCH, ABBEFOOD S., (1946). Transportation Rate Analyst, Anti-Trust Division, Department of Justice. (Social Sciences)
- DONOVAN, HENRY A., (1941). Special Assistant to the Assistant Administrator for Management, Agricultural Research Service, USDA. (Office Techniques)
- DORN, HAROLD F., (1948). Ph.D., Wisconsin. Chief, Office of Biometry, National Institutes of Health, Department of Health, Education and Welfare. (Mathematics and Statistics)
- DOSTER, JERRY C., (1952). B.A., Davidson. Chief, Personnel Operations, United States Information Agency. (Public Administration)
- DOYLE, MABEL H., (1947). A.B., Wellesley. Chief, Special Presentation Section, Publications Promotion Branch, Information Center Service, United States Information Agency. (Languages and Literature)
- DRAHEIM, E. R., (1945). Ph.D., Cornell. Administrative Officer, Office of Personnel, USDA. Taught at Minnesota, Cornell, and South Dakota State. (Public Administration)
- DREIS, THELMA A., (1952). Ph.D., American. Nutrition Programs Service, Agricultural Research Service, USDA. (Social Sciences)
- EDELSON, HOWARD, (1952). M.A., Ohio State. Statistician, Food and Drug Administration, Department of Health, Education and Welfare. Taught at Ohio State. (Mathematics and Statistics)
- EDWARDS, GENIANA R., (1950). M.A., George Washington. Information and Editorial Specialist, Foreign Agricultural Service, USDA. (Languages and Literature)
- ELEV, LYNN W., (1953). Ph.D., Iowa. Organization and Methods Examiner, Personnel Division, Agricultural Marketing Service, USDA. (Public Administration)
- ELLER, JEROME N., (1953). B.A., St. John's. Administrative Assistant to Representative Marshall of Minnesota, U. S. House of Representatives. (Public Administration)
- ELLIS, N. R., (1952). M.S., Wisconsin. Head, Meat Production and Quality Research Section, Animal and Poultry Husbandry Research Branch, Agricultural Research Service, USDA. (Biological Sciences; Agricultural Research Center Committee)
- EMERY, WALTER B., (1945). Ph.D., Wisconsin. Consultant, Joint Committee on Educational Television. Taught at Oklahoma, Wisconsin, and Ohio State. (Languages and Literature)
- ENGBERG, RUSSELL C., (1946). Ph.D., Columbia. Chief, Research and Information Division, Farm Credit Administration. Taught at Iowa State, Minnesota, and Idaho. (Social Sciences)
- ERHARDT, F. L., (1955). M.A. American. Assistant Chief of Publications, Office of Information, USDA. Taught at North Dakota. (Languages and Literature)
- ESTEN, RANDALL D., (1950). M.S., Syracuse. Chief, Map Compilation Techniques Section, Engineer Research and Development Laboratory, Department of the Army. Taught at Syracuse. (Mathematics and Statistics)
- ETIENNE, MARGUERITE, (1951). B.A., Rennes. Instructor, George Washington University. (Languages and Literature)
- EVERETT, GEORGE H., (1946). C.E., Clarkson College of Technology. Cartographic Engineer, U. S. Coast and Geodetic Survey, Department of Commerce. Taught at American Institute, Bolivia. (Technology)
- FIELDS, WALTER S., (1955). B.S., Michigan State. Plant Pathologist, Plant Quarantine Branch, Agricultural Research Service, USDA. (Biological Sciences)
- FINDLAY, JOSEPH P., (1947). A.B., George Washington. Chief, Division of Classification, Office of Personnel, USDA. (Public Administration)
- FINLAY, S. BERNARD, (1955). Graduate, Instituto Massimo (Rome); B.A., Georgetown; Diploma, Sorbonne. Foreign Broadcast Monitor and Interpreter. Taught in Italy, France, and Washington, D. C. (Languages and Literature)
- FITZPATRICK, RICHARD S., (1947). M.A., American. Chief, USA Branch, Intelligence Production Division, Office of Research and Intelligence, United States Information Agency. Taught at American. (Social Sciences)
- FLAVIN, THOMAS J., (1946). LL.B., Georgetown. Judicial Officer, Office of the Secretary, USDA. Taught at Georgetown. (Public Administration)
- FLETCHER, HEWITT G., (1954). Ph.D., Massachusetts Institute of Technology. Chief, Section on Carbohydrates, National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Department of Health, Education, and Welfare. (NIH)
- FLORY, EVAN L., (1954). Ph.D., Nebraska. Chief, Branch of Land Operations, Bureau of Indian Affairs, Department of the Interior. (Technology)
- FONDREN, JAMES P., (1954). B.S.C.E., Arkansas. Cartographer, Soil Conservation Service, USDA. (Technology)
- FONFARA, EDWARD W., (1950). Cartographic Engineer, Hydrographic Office, Department of the Navy. (Technology)
- FOOTE, RICHARD J., (1940). M.S., Iowa State. Head, Price and Trade Research Section, Statistical and Historical Research Branch, Agricultural Marketing Service, USDA. (Mathematics and Statistics; Social Sciences)
- FORBES, JAMES D., (1950). LL.B., Southeastern. Attorney Advisor, Office of General Counsel, USDA. (Correspondence)

- FORBES, ROBERT B., (1954). B.S., University of Washington. Chief, Research Branch, Office of the Quartermaster General, Department of the Army. (Physical Sciences)
- FORSYTHE, WILLIAM J., (1950). Chief, Photographic Services Section, Office of Information, USDA. (Technology)
- FOSTER, WILLIAM A., (1955). M.S., University of the State of New York. Special Assistant for Instrumentation and Instruction, Hydrographic Office, Department of the Navy. (Technology)
- FOX, KARL A., (1954). Ph.D., California. Economist, Council of Economic Advisors, Executive Office of the President. Taught at California. (Social Sciences)
- FRENCH, PATTERSON, (1949). Ph.D., Columbia. Technical Assistance Officer, International Bank for Reconstruction and Development. (Public Administration)
- FRETTS, CARL A., (1946). C.P.A., B.S., Pittsburgh. Assistant Manager, Federal Crop Insurance Corporation, USDA. Taught at Pittsburgh. (Committee on Internal Audit)
- FRIED, MAURICE, (1953). Ph.D., Purdue. Soil Scientist, Agricultural Research Service, USDA. Taught at Purdue. (Languages and Literature)
- FRIEDMAN, S. J., (1955). B.S., George Washington. Chief, Photogrammetry Section, Engineer Research and Development Laboratory, Department of the Army. (Technology)
- FRITZ, SIGMUND, (1953). D.Sc., Massachusetts Institute of Technology. Meteorologist, Weather Bureau, Department of Commerce. Taught at National. (Physical Sciences)
- FUCHS, ROBERT H., (1949). A.B., American. Accountant. (Office Techniques; Public Administration)
- GAASTERLAND, KATHRINE WILKEY, (1948). M.A., Columbia. Administrative Assistant, United States Information Agency. Taught at Chattanooga Public Schools and State Teachers College (Indiana, Pa.). (Office Techniques)
- GALE, ESSON M., (1955). Litt. Ph.D., Leyden. Administrator and Scholar, Far Eastern Affairs. Taught at Michigan, California, Virginia, George Washington, and Northwestern. (Social Sciences)
- GALLUP, GLADYS G., (1946). Ed.D., George Washington. Assistant Director, Division of Extension Research and Training, Federal Extension Service, USDA. Taught at Louisiana, Tennessee, North Carolina, Virginia, Maryland, Florida, Colorado A. and M., Oregon State, and Washington State. (Committee on Internship Cooperation; Social Sciences)
- GASS, SAUL I., (1954). M.A., Boston University. Applied Science Representative, International Business Machines Corporation. (Mathematics and Statistics)
- GEARHART, DOROTHY F., (1955). Graduate, Boston School of Design. Gift Buyer, Woodward and Lothrop. (Technology)
- GEHRING, J. H., (1949). C.E., Rutgers. Manager, Ordnance Facilities Branch, Bureau of Yards and Docks, Department of the Navy. (Technology)
- GERMOND, H. H., (1953). Ph.D., Wisconsin. Chief Mathematician (Navy), Directorate of Intelligence. Taught at Florida. (Mathematics and Statistics)
- GERRETSON, FRED W., (1954). Ph.B., Wisconsin. Government Representative for Photo Products Departments, E. I. du Pont de Nemours and Company. (Technology)
- GILL, WILLIAM A., (1950). The William Gill Company, Management Consultants. (Public Administration)
- GILSTRAP, MARGUERITE, (1948). B.S., Arkansas. Information Specialist, Agricultural Research Service, USDA. (Languages and Literature)
- GLENN, EDMUND S., (1955). M.A., University of Paris. Chief, Interpreting Branch, Department of State. Research Associate, Georgetown University. (Social Sciences)
- GLOVER, EARL R., (1951). M.S., Texas A and M. Assistant to the Director, Marketing Research Division, Agricultural Marketing Service, USDA. (Committee on Internship Cooperation)
- GOLDSTEIN, HYMAN, (1953). Ph.D., Columbia. Chief, Current Reports Section, Biometrics Branch, National Institute of Mental Health, Department of Health, Education, and Welfare. (NIH)
- GOODSELL, WYLIE D., (1939). Ph.D., Iowa State. Head, Cost and Returns Unit, Production Economics Branch, Agricultural Research Service, USDA. Taught at Iowa State. (Social Sciences)
- GRANT, CHARLES L., (1943). Deputy Director, Office of Budget and Finance, USDA. (Public Administration)
- GRANT, ROBERT, (1954). LL.B., Catholic. Executive Officer, National Heart Institute, National Institutes of Health, Department of Health, Education, and Welfare. (NIH)
- GRAY, THOMAS I., JR., (1949). B.S., Arkansas State. Meteorologist, Weather Bureau, Department of Commerce. Taught at Arkansas State. (Physical Sciences)
- GREENHOUSE, SAMUEL W., (1954). M.A., George Washington. Mathematical Statistician, National Cancer Institute, National Institutes of Health, Department of Health, Education, and Welfare. (Mathematics and Statistics)
- GREENLY, B. COLIN, (1955). A.B., Harvard. Director of Art, Landon School for Boys, Bethesda, Maryland. Taught at Potomac School. (Technology)
- GRISWOLD, GALE, (1954). M.A., Stanford. Films Officer, Overseas Audio-Visual Services Division, Foreign Operations Administration. Taught at Stanford, Modesto (California) Junior College, and American. (Languages and Literature)
- GUIDRY, NELSON P., (1947). Geographer, Foreign Agricultural Service, USDA. (Mathematics and Statistics)
- GULLICKSON, CLARICE D., (1955). B.S., North Dakota Agricultural College. Dietetic Specialist in Administration, Department of Medicine and Surgery, Veterans Administration. (Technology)

- HAGOOD, MARGARET JARMAN, (1943). Ph.D., North Carolina. Chief, Farm Population and Rural Life Branch, Division of Agricultural Economics, Agricultural Marketing Service, USDA. Taught at North Carolina and Wisconsin. (Mathematics and Statistics; Social Sciences)
- HAINSWORTH, R. G., (1938). M.A., American. Principal Economic Geographer, Foreign Agricultural Service, USDA. (Mathematics and Statistics; Technology)
- HALL, DAVID G., (1954). M.S., Kansas State. Chief, Publications Branch, Information Division, Agricultural Research Service, USDA. Taught at Arkansas. (Committee on Information)
- HALL, FOREST J., (1955). B. of L., Notre Dame. Information Specialist, Agricultural Marketing Service, USDA. (Committee on Publications)
- HALL, H. DUNCAN, (1947). B.Litt., Oxford, M.A., Sydney. Historical Adviser, British Embassy. Former League of Nations official. Taught at Harvard, Sydney, and Syracuse. (Social Sciences)
- HALPERIN, MAX, (1955). Ph.D., North Carolina. Mathematical Statistician, National Institutes of Health, Department of Health, Education, and Welfare. (Mathematics and Statistics)
- HALSMAN, JULIUS, (1955). Chief, Photography Division, Armed Forces Institute of Pathology. (Technology)
- HAMM, JOSEPH F., (1954). B.C.S., Columbus. Head, Lithographic Section, Soil Conservation Service, USDA. (Technology)
- HANSEN, MORRIS H., (1939). M.A., American. Assistant Director for Statistical Standards, Bureau of the Census, Department of Commerce. Taught at American. (Mathematics and Statistics)
- HARDING, EDWARD W., (1950). M.S., Syracuse. Special Assistant, Office of the Comptroller, Department of State. (Public Administration)
- HARMAN, SUSAN E., (1937). Ph.D., Johns Hopkins. Professor of English, University of Maryland. Taught at Nebraska State Teachers College (Peru). (Languages and Literature)
- HARMON, JAMES O., (1950). M.A., Maryland. Instructor, Montgomery Junior College. Taught at Maryland. (Languages and Literature)
- HARRIS, WILLIAM S., (1946). M.S., Columbia. Acting Chief, Operations Analysis Section, Collection Division, Internal Revenue Service. (Office Techniques)
- HARROW, LEE S., (1955). Ph.D., Georgetown. Research Chemist, Division of Cosmetics, Food and Drug Administration, Department of Health, Education, and Welfare. Taught at Georgetown. (Physical Sciences)
- HASEL, AUSTIN A., (1951). B.S., Michigan. Mathematical Statistician, Forest Service, USDA. (Mathematics and Statistics)
- HAUPTMAN, ROBERT, (1954). B.E.E., City College of the City of New York. Electronics Engineer, Corvey Engineering Company. Taught at Rehrig Radio Institute and Capitol Radio Engineering Institute. (Technology)
- HEARNE, CANNON C., (1948). M.S., Wisconsin. Director, Foreign Training Division, Foreign Agricultural Service, USDA. (Social Sciences; Committee on Correspondence Study and Extension Education)
- HEFTMANN, ERICH, (1954). Ph.D., Rochester. Biochemist, National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Maryland and Rochester. (Physical Sciences)
- HENDERSON, C. O., (1942). M.S., Cornell. Chief, Employee Performance and Development, Office of Personnel, USDA. (Languages and Literature; Public Administration)
- HENDRICKS, STERLING B., (1928). Ph.D., California Institute of Technology. Head Chemist, Soil and Water Conservation Research Branch, Agricultural Research Service, USDA. Taught at Kansas State. (Biological Sciences)
- HENDRICKS, WALTER A., (1947). M.A., George Washington. In Charge, Methodology, Agricultural Estimates, Agricultural Marketing Service, USDA. Taught at North Carolina State. (Mathematics and Statistics)
- HENSCHEL, RICHARD, (1954). B.S., Ursinus. Executive Officer, Clinical Center, National Institutes of Health, Department of Health, Education, and Welfare. (NIH)
- HENSLEY, MARTHA L., (1950). M.S., Kansas State. Home Economist, Agricultural Research Service, USDA. Taught at Illinois and Montana State. (Technology)
- HESS, SIDNEY M., (1950). Ph.D., Georgetown. Pharmacologist, National Heart Institute, National Institutes of Health, Department of Health, Education, and Welfare. (Physical Sciences)
- HICKEY, THOMAS J., (1943). LL.M., Columbus University. Deputy Comptroller, Bureau of Medicine and Surgery, Department of the Navy. (Office Techniques)
- HICKS ZELMA J., (1955). C.P.S., Institute for Certifying Professional Secretaries. Assistant to the Chief, Administrative Management Division, Office of Information, USDA. (Office Techniques)
- HIGGINSON, W. S., (1946). M.A., Utah. Chief, Multiplex Unit, Photogrammetric Section, U. S. Geological Survey, Department of the Interior. Taught at George Washington. (Technology)
- HILBERT, G. E., (1950). Ph.D., Yale. Director of Utilization Research, Agricultural Research Service, USDA. (Public Administration)
- HOBBS, MARGARET O., (1950). A.B., George Washington. Teacher, Calvin Coolidge High School. (Office Techniques)
- HODGSON, RALPH E., (1947). Ph.D., Wisconsin. Chief, Dairy Husbandry Research Branch, Agricultural Research Service, USDA. (Biological Sciences)
- HOFFMAN, CLARENCE H., (1955). Ph.D., Minnesota. Assistant Chief, Entomology Research Branch, Agricultural Research Service, USDA. Taught at Minnesota. (Agricultural Research Center Committee)
- HOIBERG, HANS S., (1949). M.A., Columbia. Head, Training Section, Rural Electrification Administration, USDA. (Committee on Correspondence Study and Extension Education)

- HOLDEN, JOHN B., (1951). LL.B., Columbus. Chief, Division of Procurement and Property Management, Office of Budget and Finance, USDA. (Public Administration)
- HORD, WARNER H., (1945). M.B.A., Harvard. Chief, Office of Carrier Accounts and Statistics, Civil Aeronautics Board. Taught at Tulane. (Public Administration)
- HORECKER, BERNARD L., Ph.D., Chicago. Biochemist, Chief, Section of Enzymes and Cellular Biochemistry, National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Department of Health, Education, and Welfare. Taught at George Washington. (NIH)
- HORWITZ, WILLIAM, (1951). Ph.D., Minnesota. Chief of Dairy and Cereal Branch, Food and Drug Administration, Department of Health, Education and Welfare. (Physical Sciences)
- HOUSEMAN, EARL E., (1951). M.A., South Dakota. Chief, Statistical Officer, Office of the Administrator, Agricultural Marketing Service, USDA. (Mathematics and Statistics)
- HUBBARD, HENRY F., (1955). Ph.D., George Washington. Personnel Officer, Department of General Administration, District of Columbia Government. Taught at George Washington. (Public Administration)
- HUBERT, LESTER F., (1955). M.S., Chicago. Meteorologist, Weather Bureau, Department of Commerce. (Physical Sciences)
- HUGHES, JOHN R., (1955). Ph.D., Harvard. Scientist, National Institute of Mental Health, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Franklin and Marshall. (Biological Sciences)
- IRVING, GEORGE W., JR., (1946). Ph.D., George Washington. Deputy Administrator, Agricultural Research Service, USDA. Taught at Cornell Medical School and George Washington. (Committee on Internship Cooperation)
- JACKSON, SETH, (1955). B.S., Cornell. Administrative Officer, Forest Service, USDA. (Correspondence)
- JACOBS, WOODROW C., (1942). Ph.D., California. Director of Climatology, Air Weather Service, Department of the Air Force. Taught at California and Massachusetts Institute of Technology. (Physical Sciences)
- JAFFE, ERWIN, (1947). Ph.D., Harvard. Chief, Flight Information Division, Office of Aviation Information, Civil Aeronautics Administration, Department of Commerce. Taught at Harvard. (Languages and Literature)
- JEBENS, ARTHUR B., (1953). J.D., Iowa. Director of Management Research, Office of the Administrative Assistant Secretary, Department of the Interior. (Public Administration)
- JEFFERSON, MERRILL E., (1954). B.S., George Washington. Physicist, Soil and Water Conservation Research Branch, Agricultural Research Service, USDA. (Biological Sciences)
- JENKINS, CHARLES I., (1955). LL.B., National. C.P.A. Chief, Division of Accounting and Audit, Office of Budget and Finance, USDA. (Office Techniques)
- JESSEL, J. J. A., (1942). D.Sc., Harvard. Head of Transmission and Coordination Section, Bureau of Power, Federal Power Commission. Taught at Harvard. (Technology)
- JEX, GARNETT, (1955). M.F.A., George Washington. Visual Information Specialist, United States Public Health Service, Department of Health, Education, and Welfare. (Technology)
- JOHNSON, EDWARD C., (1947). LL.B., George Washington. Hearing Examiner, Securities and Exchange Commission. Taught at Southeastern. (Public Administration)
- JOHNSON, SHERMAN E., (1937). Ph.D., Harvard. Director, Farm and Land Management Research, Agricultural Research Service, USDA. Taught at Minnesota, Montana State, and South Dakota State. (Social Sciences)
- JOHNSTON, MARJORIE C., (1942). Ph.D., University of Texas. Specialist, Comparative Education, American Republics, Division of International Education, Office of Education, Department of Health, Education and Welfare. Taught at Texas, Stephens College, George Washington, and San Diego State. (Languages and Literature)
- JOSEPHSON, HORACE R., (1949). Ph.D., California. Chief, Division of Forest Economics Research, Forest Service, USDA. Taught at California. (Social Sciences)
- JOY, BARNARD, (1953). Ed.D., George Washington. Assistant to the Administrator, Agricultural Research Service, USDA. (Committee on Cooperative Extension Education)
- KAPLAN, LOUIS C., (1955). LL.M., Georgetown. Trial Attorney, Federal Power Commission. (Technology)
- KAUFHOLZ, FERDINAND, (1949). B.C.E., Johns Hopkins. Deputy Regional Director, Public Buildings Service, General Services Administration. (Technology)
- KAUFMAN, MAXWELL, (1955). M.B.A., Harvard. Administrative Officer, Division of Corporation Finance, Securities and Exchange Commission. Taught at Temple and American. (NIH)
- KAUFMAN, MILTON, (1940). M.S., City College of the City of New York. Survey Statistician, Bureau of the Census, Department of Commerce. (Mathematics and Statistics)
- KEILES, ELSA O., (1945). D.Sc., Johns Hopkins. Principal Biochemist, Division of Research Grants, National Institutes of Health, Department of Health, Education and Welfare. (Physical Sciences)
- KETY, SEYMOUR S., (1954). M.D., Pennsylvania. Scientific Director, National Institute of Mental Health and Neurological Diseases and Blindness, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Pennsylvania. (NIH)
- KING, J. E., (1948). Chief, Cartographic Section, Division of Engineering, Forest Service, USDA. (Technology)
- KIRKHAM, MARK M., (1954). Graduate study, University of Chicago. Assistant Director, Budget and Finance Division, Agricultural Research Service, USDA. (Public Administration; Office Techniques)

- KNIPLING, EDWARD F., (1954). Ph.D., Iowa State. Chief, Entomology Research Branch, Agricultural Research Service, USDA. (Biological Sciences)
- KOCH, E. JAMES, (1953). M.S., North Carolina State. Biometrician, Agricultural Research Service, USDA. (Biological Sciences)
- KOEBEL, RALPH F., (1943). S.I.D., Georgetown. Chief, General Legal Services Division, Office of the General Counsel, USDA. (Public Administration)
- KOFFSKY, NATHAN M., (1954). M.A., American. Chief, Farm Income Branch and Vice-chairman, Outlook and Situation Board, Agricultural Marketing Service, USDA. (Social Sciences)
- KOHLER, MAX A., (1950). B.S., New Mexico. Chief Research Hydrologist, Weather Bureau, Department of Commerce. (Physical Sciences; Correspondence)
- KRIESBERG, MARTIN, (1952). Ph.D., Harvard. Marketing Specialist, Agricultural Marketing Service, USDA. Professorial Lecturer, American University. Taught at Michigan. (Public Administration)
- KUSNER, JOSEPH H., (1949). Ph.D., Pennsylvania. Chief, Program Review and Analysis Section, Industrial Division, Office of Chief of Ordnance, Department of the Army. Taught at Pennsylvania and Florida. (Mathematics and Statistics)
- LAMPHERE, WILLARD H., (1952). B.S., Idaho. Assistant Director for Production Adjustment, Information Division, Commodity Stabilization Service, USDA. (Committee on Information)
- LANDIS, SAMUEL E., (1953). B.A., George Washington. Organization and Methods Examiner, Department of the Navy. (Office Techniques)
- LANDO, ROBERT H., (1947). M.A., California. Records Management Officer, Agricultural Marketing Service, USDA. (Office Techniques)
- LANE, IRA A., (1954). B.S., New York State College of Forestry. Assistant to Training Officer, Plant Quarantine Branch, Agricultural Research Service, USDA. (Biological Sciences)
- LANG, C. C., (1953). B.S., Ohio State. Associate Leader, 4-H Club and YMW Programs, Federal Extension Service, USDA. (Committee on Cooperative Extension Education)
- LAXTON, WILLIAM C., (1946). A.B., George Washington. Director, Personnel Division, Agricultural Marketing Service, USDA. (Public Administration)
- LAZZARI, PIETRO, (1944). Master Artist, Ornamental School of Rome. Belle Arti. Portrait artist, landscape painter, and graphic designer. Taught at American and Beaux Arts Institute of Design, New York. (Technology)
- LEARMOUTH, ROBERT, (1954). B.C.S., Southeastern. Financial Management Officer, National Institutes of Health, Department of Health, Education, and Welfare. (NIH)
- LE CLERG, E. L., (1949). Ph.D., Minnesota. Chief, Biometrical Services, Agricultural Research Service, USDA. (Biological Sciences)
- LEDERER, MARIANNE, (1947). Lehramtspruefung, University of Vienna. Taught in the secondary and higher schools of Vienna. (Languages and Literature)
- LEEDY, DANIEL L., (1950). Ph.D., Ohio State. Biologist in Charge of Cooperative Wildlife Research Units, Fish and Wildlife Service, Department of the Interior. (Biological Sciences)
- LEFEBVRE, R. J., (1946). B.Ch., New York. Chief, GPO—Department of State Service Office. (Technology)
- LEHMAN, ARNOLD J., (1949). Ph.D., M.D., Stanford. Chief, Division of Pharmacology, Food and Drug Administration, Department of Health, Education, and Welfare. Taught at Washington, Stanford, Oklahoma, Wayne, and North Carolina. (Physical Sciences)
- LEICH, HAROLD H., (1946). A.B., Dartmouth. Chief, Standards Division, Civil Service Commission. (Public Administration)
- LEIFSON, GUNNAR, (1952). M.S., Washington. Head, Survey Branch, Hydrographic Office, Department of the Navy. (Technology)
- LEIKIND, MORRIS C., (1945). M.Sc., Ohio State. Chief, Division of Historical Research, Medical Museum, Armed Forces Institute of Pathology. Taught at Ohio State. (Biological Sciences)
- LEVY, JOSEPH B., (1952). Ph.D., Harvard. Senior Research Associate, Naval Ordnance Laboratory, Department of the Navy. (Physical Sciences)
- LEWIS, EDWARD J., (1952). Records Manager, Internal Revenue Service, Department of the Treasury. (Office Techniques)
- LEWIS, KEITH B., (1946). A.B., Georgia. Manager, Washington Office, Eastman Kodak Company. (Technology)
- LIEBERMAN, JACOB E., (1950). B.S., Brooklyn. Mathematical Statistician, National Institutes of Health, Department of Health, Education, and Welfare. (Correspondence)
- LIEBLEIN, JULIUS, (1954). Ph.D., American. Mathematical Statistician, National Bureau of Standards, Department of Commerce. (Mathematics and Statistics)
- LILLIE, RALPH D., (1954). M.D., Stanford. Chief, Laboratory of Pathology and Histochemistry, National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Maryland. (NIH)
- LILLY, JOHN C., (1954). M.D., Pennsylvania. Chief, Section on Cortical Integration, Laboratory of Physiology, National Institute of Mental Health, National Institutes of Health, Department of Health, Education, and Welfare. (NIH)
- LINN, ALICE C., (1954). M.S., Kansas State. Extension Clothing Specialist, Federal Extension Service, USDA. (Committee on Cooperative Extension Education)
- LOBB, JAMES H., (1954). B.S., Fordham. Supervisory Auditor, Division of Audits, General Accounting Office. (Public Administration)
- LOFTUS, JOSEPH P., (1946). A.B., St. Mary's College. Chief, Fiscal Management, Office of Budget and Finance, USDA. (Public Administration)
- LOGAN, CHARLES A., (1947). M.S., Kansas State. Superintendent, Office of Operations, Agricultural Research Center, USDA. Taught at Kansas State. (Agricultural Research Center Committee)

- LUCAS, JOHN S., (1937). Department Records Security Officer, Office of Plant and Operations, USDA. (Office Techniques)
- LUTTRELL, DOROTHY M., (1947). Records Manager, Internal Revenue Service. (Office Techniques)
- LYMAN, JOHN, (1951). M.S., Scripps Institution of Oceanography, University of California. Director, Division of Oceanography, Hydrographic Office, Department of the Navy. (Physical Sciences)
- LYNDE, LYDIA A., (1853). M.S., Purdue. Formerly Parent and Family Life Education Specialist, Federal Extension Service, USDA (Technology)
- LYON, ROWLAND, (1946). M.A., George Washington. Staff Member, National Collection of Fine Arts, Smithsonian Institution. Taught at George Washington. (Technology)
- MACK, CLIFTON E., (1946). LL.B., Suffolk. Commissioner, Federal Supply Service, General Services Administration. Taught at American. (Public Administration)
- MAGNITZKY, A. WAYNE, (1954). B.S., Tulane. Head, Formulation Section, Division of Oceanography, Hydrographic Office, Department of the Navy. Taught at Tulane. (Physical Sciences)
- MAGNUSON, HENRY A., (1955). Certificate in Architecture, Massachusetts Normal Art School. Architect, Corps of Engineers, Department of the Army. (Technology)
- MANDELL, MILTON M., (1955). B.S., New York. Chief, Administrative and Management Testing Unit, Civil Service Commission. Taught at City College of the City of New York. (Public Administration)
- MANGHAM, F. R., (1952). LL.B., North Texas School of Law. Director, Office of Plant and Operations, USDA. (Public Administration)
- MANGOLD, CHARLOTTE, (1950). M.A., Maryland. Taught at Maryland. (Languages and Literature)
- MARSHALL, HERBERT G., (1946). Audit Supervisor, Internal Audit Division, General Services Administration. (Public Administration)
- MARSHALL, HOWARD E., (1954). Chief, Fiscal Control, Forest Service, USDA. (Committee on Internal Audit)
- MARTIN, LEALON E., (1954). B.A., Millsap. Chief, Heart Information Center, National Heart Institute, National Institutes of Health, Department of Health, Education, and Welfare. (NIH)
- MASON, CHARLES N., (1943). M.A., Montana. Accountant. Taught at Montana and George Washington. (Public Administration)
- MATERAZZI, ALBERT R., (1948). D.Ch., University of Rome. Technical Representative and Research Advisor, Litho Chemical and Supply Company, Inc. (Technology)
- MATTHEWS, JOSEPH L., (1952). Ph.D., Chicago. Chief, Program Research Branch, Division of Extension Research and Training, Federal Extension Service, USDA. (Social Sciences)
- MAXWELL, ROBERT W., (1946). LL.B., Washington College of Law, American University. Commissioner of Accounts, Department of the Treasury. (Public Administration)
- MAY, EUGENE, (1952). Cartographic Engineer, Soil Conservation Service, USDA. (Correspondence)
- McCLARREN, J. KENDALL, (1946). Chief, Program and Special Services Branch, Information Division, Agricultural Research Service, USDA. (Languages and Literature)
- McCORMICK, JAMES H., (1946). M.S., Georgetown. Assistant Director, Office of Information, USDA. (Committee on Publications)
- McCULLOUGH, NORMAN B., (1954). Ph.D., M.D., Chicago. Chief, Laboratory of Clinical Investigation, National Microbiological Institute, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Michigan State, Chicago, Detroit Institute of Technology, and Georgetown. (NIH)
- McDONALD, WILLIAM T., (1955). M.A., Arkansas. Executive Vice-Chairman, Interagency Advisory Group, Civil Service Commission. (Public Administration)
- McDONOUGH, THOMAS J., (1953). M.S. in E.E., Stevens Institute of Technology. Telephone Systems Design Engineer, Rural Electrification Administration, USDA. (Technology)
- McHENRY, WILLIAM C., (1948). Assistant Production Manager, Operations Research Office, Johns Hopkins University. (Technology)
- McINTYRE, RALPH G., (1953). LL.B., Columbus. Property Management Officer, Division of Procurement and Property Management, Office of Budget and Finance, USDA. (Public Administration)
- McKENNA, DUANE A., (1952). B.F.A., South Dakota. Art Director, Broadcasting and Telecasting Magazine. (Technology)
- McNAMARA, FRED A., (1953). A.B., Harvard. Assistant Chief, Labor and Welfare Division, Bureau of the Budget. (Public Administration)
- McSHEA, JOHN F., (1941). C.P.A. Assistant Director, Audit Division, Commodity Stabilization Service, USDA. (Committee on Internal Audit)
- McWHORTER, JESSE B., (1950). M.C.S., Benjamin Franklin. Chief, Estimates Section, Office of Budget and Finance, USDA. (Office Techniques)
- McCREADY, ROBERT M., (1955). B.S., Rutgers. Supervisory Cartographer, Aeronautical Charts and Information Center, Department of the Air Force. Taught at Maryland. (Technology)
- MEHLER, ALAN H., (1954). Ph.D., New York. Chemist, National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Department of Health, Education, and Welfare. Taught at New York and Chicago. (NIH)
- MESSINGER, ROBERT L., (1955). B.S., Pennsylvania State. Cartographic Supervisory Instructor, Aeronautical Charts and Information Center, Department of the Air Force. (Technology)
- MEWIS, B. H., (1953). B.J., Missouri. Head, Program Services, Information Division, Agricultural Research Service, USDA. (Languages and Literature)

- MILEHAM, HARRY P., (1947). M.A., Columbia. Chief of Publications, Office of Information, USDA. (Languages and Literature; Committee on Publications)
- MILLER, A. R., (1949). D.V.M., Iowa State; LL.B., Georgetown. Chief, Meat Inspection Branch, Agricultural Research Service, USDA. (Office Techniques; Public Administration)
- MILLER, LOWELL E., (1951). J.D., State University of Iowa. Attorney, Office of General Counsel, USDA. (Correspondence)
- MILLER, MARTIN H., (1955). M.A., Western Reserve. National Sales Representative, Savings Bonds Division, Department of the Treasury. Grand Prize Winner, 1954, National Newspaper Snapshot Contest. Winner, John R. Hogan trophy, Photographic Society of America, 1955. (Technology)
- MINOR, WILLIAM A., (1946). B.S.A., Georgia. Assistant Administrator for Management, Foreign Agricultural Service, USDA. (Public Administration)
- MOHAGEN, VERNA C., (1942). M.A., George Washington. Director, Personnel Management Division, Soil Conservation Service, USDA. (Office Techniques)
- MOHRHARDT, FOSTER E., (1955). M.A., Michigan. Director, Library, USDA. (Languages and Literature)
- MOORE, WILLIAM L., (1948). A.B., Antioch. Chief, Personnel Division, Farm Credit Administration. (Office Techniques)
- MOSEMAN, ALBERT H., (1947). Ph.D., Minnesota. Director, Crops Research, Agricultural Research Service, USDA. (Biological Sciences)
- MOSSETT, ERICH, (1954). Ph.D., Vienna. Assistant Chief, Laboratory of Chemistry, National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Vienna and Virginia. (Languages and Literature)
- MOUSER, C. M., (1953). M.A., Louisiana State. Chief Clerk, Senate Committee on Agriculture and Forestry. Taught at Sam Houston State and Northwestern State. (Office Techniques; Social Sciences)
- MOYER, EUGENE C., (1946). C.P.A., B.S., Georgetown. Practicing Certified Public Accountant; Adjunct Professor, American. (Public Administration)
- MURPHY, CHARLES D., (1947). Ph.D., Cornell. Professor of English, University of Maryland. (Languages and Literature)
- MURR, CARL, (1955). Executive Secretary, Incentive Awards Committee, United States Civil Service Commission. (Languages and Literature)
- MYERS, CHARLES T., JR., (1955). Chief, Division of Photography, Office of Information, USDA. (Technology)
- NEWELL, STERLING R., (1929). M.A., American. Director, Agricultural Estimates Division, Agricultural Marketing Service, and Chairman, Crop Reporting Board, USDA. (Mathematics and Statistics)
- NEWSTEIN, HERMAN, (1954). M.S., New York. Research Meteorologist, Weather Bureau, Department of Commerce. (Physical Sciences)
- NIKIFOROFF, CONSTANTIN C., (1948). Ph.D., St. Petersburg. Soil Scientist, Soil Conservation Service, USDA. Taught at Minnesota and Maryland. (Physical Sciences)
- NISSELSON, HAROLD, (1946). B.S., City College of the City of New York. Chief, Field Methods Research Branch, Bureau of the Census, Department of Commerce. Taught at American. (Mathematics and Statistics)
- NOLAN, EDWIN T., (1949). B.C.S., Columbus. Deputy Chief, Accounting and Financial Policy Division, Office of the Comptroller of the Army. (Public Administration)
- NORTON, ETHAN A., (1949). M.S., Illinois. Acting Chief, Conservation Needs and Records Branch, Soil Conservation Service, USDA. Taught at Illinois and Texas A. and M. (Committee on Internship Cooperation)
- NOWICKI, ALBERT L., (1948). M.C.E., Minnesota. Chief, Photogrammetric Division, Army Map Service, Department of the Army. Taught at Minnesota and Marquette. (Technology)
- NYSTROM, PAUL E., (1950). D.P.A., Harvard. Director of Instruction, College of Agriculture, University of Maryland. (Social Sciences)
- O'BRIEN, JAMES C., (1955). LL.B., Columbus. Director of Personnel, Department of Health, Education, and Welfare. (Public Administration)
- O'BRIEN, RUTH, (1952). LL.B., George Washington. Chief, Home Economics Research Branch, Agricultural Research Service, USDA. Taught at Iowa State. (Committee on Internship Cooperation; Agricultural Research Center Committee)
- OLSON, BYRON J., (1952). Ph.D., M.D., Minnesota. Medical Director, Laboratory of Infectious Diseases, National Microbiological Institute, National Institutes of Health, Department of Health, Education and Welfare. (Biological Sciences)
- OLSON, KENNETH W., (1952). M.A., Michigan. Director, Foreign Market Information Division, Foreign Agricultural Service, USDA. (Languages and Literature)
- ONCKEN, WILLIAM, JR., (1955). B.A., Princeton. Chief, Training and Development Division, Office of Civilian Personnel, Department of the Army. (Public Administration)
- ORNSTEIN, JACOB, (1952). Ph.D., Wisconsin. Assistant Professor (On Leave), New Mexico A. and M. Taught at Wisconsin, Waldorf, and Catawba. (Languages and Literature)
- OSBORNE, JAMES G., (1953). B.S., California. Statistical Analyst, Forest Service, USDA. (Mathematics and Statistics)
- PABST, W. R., (1948). Ph.D., Columbia. Chief Statistician, Bureau of Ordnance, Department of the Navy. Taught at Cornell, Amherst, and Tulane. (Mathematics and Statistics)
- PALMER, PIERRE S., (1953). A.B., Chicago. Senior Budget Examiner, Bureau of the Budget. (Public Administration)

- PARKER, GARALD G., (1954). M.S., Washington. Chief, Manpower and Training Section, Ground Water Branch, Geological Survey, Department of Interior. (Physical Sciences)
- PARKER, MARION W., (1935). Ph.D., Maryland. Head, Weed Investigation Section, Agricultural Research Service, USDA. Taught at Maryland. (Biological Sciences)
- PARKIN, ERNEST J., (1950). B.S., George Washington. Mathematician, U. S. Coast and Geodetic Survey, Department of Commerce. Taught at Ohio State. (Technology)
- PATTERSON, WILBUR I., (1951). Ph.D., Illinois. Chief, Basic Chemistry Unit, Dairy Products Section, Eastern Utilization Research Branch, Agricultural Research Service, USDA. (Physical Sciences)
- PEARSON, KAY, (1949). M.A., Alabama. Head, Correspondence Management Section, Administrative Office, Department of the Navy. (Office Techniques)
- PECHANEC, JOSEPH F., (1955). B.S., Iowa. Chief, Division of Range Management Research, Forest Service, USDA. (Committee on Internship Cooperation)
- PELTIER, LOUIS, (1953). Ph.D., Harvard. Geologist, U. S. Geological Survey, Department of the Interior. Taught at Bucknell, Harvard, and Washington. (Physical Sciences)
- PERLMUTTER, JEROME, (1955). A.B., George Washington. Publications Writer, Agricultural Research Service, USDA. Taught at American. (Languages and Literature; Committee on Publications)
- PERRIN, JAMES F., (1946). LL.B., National. Commerce Counsel, Director of Transportation and Communications, Assistant Secretary of Defense (Supply and Logistics), Office of the Secretary of Defense. (Social Sciences)
- PETERSON, EUGENE J., (1948). B.S., Wisconsin. Chief, Training and Safety Branch, Personnel Division, Soil Conservation Service, USDA (Committee on Correspondence Study and Extension Education; Office Techniques; Technology)
- PICKENS, JAMES, (1944). Technical Editor, Bureau of Plant Industry, Soils and Agricultural Engineering, USDA (retired). Taught at Foyer du Soldat, France. (Correspondence)
- PIKE, HOWLAND, (1950). District Manager, Government Sales, Ansco Division, General Aniline and Film Corporation. (Technology)
- POLLOCK, ROSS, (1946). M.A., George Washington. Chief, Career Development Program, Civil Service Commission. (Public Administration)
- PONCE, ODLÓN, (1952). Degree of Professor, University of Córdoba. Editor, Pan American Sanitary Bureau. Taught at Córdoba, Manchester, and North Carolina. (Languages and Literature)
- POPECKI, JOSEPH T., (1952). B.S.L.S., Catholic. Assistant to the Director of Libraries, Catholic University. Taught at Catholic. (Languages and Literature)
- POSNER, BEN, (1952). M.A., George Washington. Budget Officer, U. S. Information Agency. Taught at Arizona and George Washington. (Public Administration)
- POTTER, W. D., (1952). B.S., California Institute of Technology. Highway Research Engineer, Hydraulic Research Branch, Bureau of Public Roads, Department of Commerce. (Technology)
- PRATT, JAMES W., (1954). Ph.D., Georgetown. Chemist, National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Boston College, Georgetown, and Montgomery Junior College. (Physical Sciences)
- PRESTON, JOHN F., (1951). M.S.F., Michigan. Chief of Forestry Division, Soil Conservation Service, USDA (retired). (Correspondence)
- PRICE, H. WALTER, (1953). B.S., Drexel Institute of Technology. Electronics Engineer, Diamond Ordnance Fuse Laboratory. (Technology)
- PRICKETT, C. S., (1954). Ph.D., Georgetown. Pharmacologist, Food and Drug Administration, Department of Health, Education and Welfare. Taught at Maryland and Georgetown. (Physical Sciences)
- PURDY, ELDRIDGE E., (1943). Master of Photography. Photographic Library, Office of Information, USDA. (Technology)
- PURVES, C. M., (1926). M.A., Minnesota. Deputy Director, Foreign Agricultural Analysis Division, Foreign Agricultural Service, USDA. Taught at Texas A. and M. (Mathematics and Statistics)
- QUISENBERRY, KARL S., (1955). Ph.D., Minnesota. Assistant Director, Crops Research Branch, Agricultural Research Service, USDA. Taught at West Virginia and Nebraska. (Biological Sciences)
- RADFORD, RICHARD A., (1950). B.A., Cambridge. Research Economist, International Monetary Fund. (Social Sciences)
- RANDALL, ROBERT H., JR., (1952). M.A., George Washington. Assistant Director of Chart Construction, Hydrographic Office, Department of the Navy. (Technology)
- RASMUSSEN, WAYNE D., (1950). Ph.D., George Washington. Agricultural Historian, Agricultural Marketing Service, USDA. (Social Sciences; Correspondence)
- RAUCHSCHWALBE, OTTO, (1950). M.S., Maryland. Economist, Fish and Wildlife Service, Department of the Interior. (Mathematics and Statistics)
- RAY, RICHARD G., (1955). Ph.D., Johns Hopkins. Assistant Chief, Photogeology Section, Geological Survey, Department of the Interior. (Physical Sciences)
- REGAN, MARK M., (1955). M.A., Minnesota. Assistant Head, Land and Water Section, Production Economics Branch, Agricultural Research Service, USDA. (Social Sciences)
- REICH, DAVID, (1946). LL.B., Fordham. Attorney at Law. (Public Administration)
- RICE, HARRY W., (1953). B.C.S., Columbus. C.P.A. Associate Chief, Branch of Finance, Office of the Secretary, Department of the Interior. (Public Administration)

- RICE, WILLIAM B., (1952). Head, Program Development Staff, Office Methods Division, Department of the Navy. (Office Techniques)
- ROBESON, EVELYN J., (1955). B.S., New Mexico A. and M. Methods Examiner, Agricultural Marketing Service, USDA. (Office Techniques)
- ROBINSON, BEVERLEY, (1953). M.S., Michigan. Architect, Supply and Real Estate Division, Veterans Administration. Taught at Michigan. (Technology)
- ROBINSON, EDWARD J., (1954). Shorthand Reporter. Taught at Emerson Institute. (Office Techniques)
- ROBINSON, JAMES L., (1953). M.S., Cornell. Extension Economist, Division of Agricultural Economics, Federal Extension Service, USDA. (Committee on Correspondence Study and Extension Education)
- ROCKWELL, GEORGE M. KORENEV, (1949). B.S., Columbia. Graduate of Classical Gymnasium, Odessa and Novordsskiy University. Assistant Professor of Russian Naval Language School. Taught at Columbia and New York. (Languages and Literature)
- ROMERO, FERNANDO, (1951). Ph.D., Universidad de San Marcos. Chief, Vocational Education Section, Pan American Union. Taught at Peruvian Naval Academy and San Marcos. (Languages and Literature)
- ROSEN, S. MCKEE, (1949). Ph.D., London. Chief, Training Branch, Foreign Operations Administration. Taught at Chicago, American, and Roosevelt. (Mathematics and Statistics)
- ROSENZWEIG, BENJAMIN, (1951). B.S.Ch.E., City College of the City of New York. Program Planner, Plans and Programs Staff, Office of the Assistant Secretary of Defense (Supply and Logistics). (Technology)
- ROSER, VIRGINIA B., (1950). B.A., Emerson. Teacher of Speech. (Languages and Literature)
- ROSSITER, FRED J., (1949). M.S., Iowa State. Assistant Administrator, Foreign Service and Trade Programs, Foreign Agricultural Service, USDA. Taught at Iowa State. (Social Sciences)
- ROWE, HAROLD B., (1947). B.S., Iowa State. Member, Senior Staff, Brookings Institution. Taught at Minnesota. (Social Sciences)
- ROWE, WILLIAM H., (1934). M.S., Kansas State. Federal Crop Insurance Corporation, USDA. Taught at Kansas State and Akron. (Public Administration)
- RUBENSTEIN, ALBERT M., (1955). M.S., Maryland. Electronics Engineer, Bureau of Ships, Department of the Navy. Taught at Maryland. (Technology)
- RUPPERT, M. CLARE, (1947). M.A., George Washington. Coordinator, Adult Services, D. C. Public Library. (Languages and Literature)
- RYAN, WALTER F., (1953). Ph.D., Cornell University. Assistant Chief, Office of Statistical Standards, Bureau of the Budget. Taught at Cornell and Colgate. (Mathematics and Statistics)
- SAATY, THOMAS L., (1954). Ph.D., Yale. Scientific Analyst. Operations Evaluation Group (M.I.T.). Taught at Yale. (Mathematics and Statistics)
- SABROSKY, LAUREL K., (1947). M.S., Kansas State. Extension Analyst, Extension Research and Training, Federal Extension Service, USDA. Taught at Colorado A. and M. (Social Sciences)
- SAHAROV, GEORGE M., (1941). A.B., California. Graduate of Classical Gymnasium, Tula, Russia. Transportation Economist, Bureau of Transport Economics and Statistics, Interstate Commerce Commission. Taught at Southern California. (Languages and Literature)
- SAILER, REECE I., (1947). Ph.D., Kansas. Entomologist, Agricultural Research Service, USDA. Lecturer, University of Maryland. (Biological Sciences)
- SAMSON, VERNE L., (1942). A.B., Washington State. Former Training Officer, Public Housing Administration, Housing and Home Finance Agency. Taught at Whitworth and Washington State. (Languages and Literature; Office Techniques)
- SAROFF, HENRY A., (1954). Ph.D., Rensselaer. Scientist, National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Georgetown. (Physical Sciences)
- SAUNDERS, J. A., (1948). B.S., U.S. Naval Academy. Captain, United States Navy (Retired). (Social Sciences)
- SAWCHUK, HENRY A., (1949). M.S., City College of the City of New York. Chief, National Science, Engineering, and Legal Section, Standards Division, Civil Service Commission. (Technology)
- SAZ, ARTHUR K., (1952). Ph.D., Duke. Bacteriologist, National Microbiological Institute, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Duke, New York Medical College and Iowa State. (Biological Sciences)
- SCAMMAHORN, JAMES, (1946). Deputy Assistant Director for Supply, Division of Construction and Supply, Atomic Energy Commission. (Public Administration)
- SCANTLEBURY, RONALD, (1954). Ph.D., Michigan. Chief, Research Fellowship Branch, Division of Research Grants, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Wayne and Arkansas. (NIH)
- SCHAENZER, J. P., (1949). B.S., Wisconsin. Agricultural Engineer, Electric Operations and Loans Division, Rural Electrification Administration, USDA. (Technology)
- SCHIFFMAN, ZELDA, (1954). B.A., Hunter College, B.S.J., Columbia. Chief, Clinical Center Management Analysis Section, National Institutes of Health, Department of Health, Education, and Welfare. (NIH)
- SCHLUP, LESTER A., (1947). B.C.S., Southeastern. Director, Division of Information Programs, Federal Extension Service, USDA. (Languages and Literature)
- SCHMITZ, ELLSWORTH D., (1955). Ph.D., Chicago. Assistant Head, Program Development Staff, Office Methods Division, Department of the Navy. (Office Techniques)

- SCHNEIDER, SIDNEY, (1955). B.A., Brooklyn. Budget Analyst, General Services Administration. Taught at George Washington. (Public Administration)
- SCHOTT, RALPH G., (1947). Ph.D., Iowa State. Animal Husbandman, Animal and Poultry Husbandry Research Branch, Agricultural Research Service, USDA. Taught at Iowa State, Princeton, Johns Hopkins, and Ohio State. (Agricultural Research Center Committee)
- SCHULE, JOHN J., JR., (1954). B.A., St. John's University (N. Y.). Head, Applied Oceanography Branch, Hydrographic Office, Department of the Navy. Taught at New York. (Physical Sciences)
- SCOTT, DUNCAN N., (1951). M.A., Texas. Chief of Features Section, Press Service, U. S. Information Agency. Taught at New Mexico A. and M., Bowling Green, and Miami (Florida). (Languages and Literature)
- SCOTT, WALTER M., (1954). Ph.D., Yale. Assistant Director, Utilization Research, Agricultural Research Service, USDA. (Committee on Internship Cooperation)
- SELINSKY, HAROLD J., (1950). B.S., Georgetown. Internal Audit Staff, Army Audit Agency, Department of the Army. (Office Techniques)
- SELLERS, ASHLEY, (1941). S.J.D., Harvard. Attorney at Law. Taught at Emory and Georgia. (Public Administration)
- SHAKOW, DAVID, (1954). Ph.D., Harvard. Chief, Laboratory of Psychology, National Institute of Mental Health, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Illinois and Chicago. (NIH)
- SHANES, ABRAHAM M., (1954). Ph.D., New York. Animal Physiologist, National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Department of Health, Education and Welfare. (Biological Sciences)
- SHAW, WARREN C., (1951). Ph.D., Ohio State. Agronomist, Field Crops Research Branch, Agricultural Research Service, USDA. Taught at North Carolina State and Ohio State. (Biological Sciences)
- SHEA, H. RICHARD, JR. B.S., Harvard. Assistant Editor, "Heartland" Magazine; Director of Public Relations, Great Lakes-St. Lawrence Association. (Languages and Literature)
- SHELOKOV, ALEXIS, (1955). M.D., Stanford. Surgeon, National Microbiological Institute, National Institutes of Health, Department of Health, Education and Welfare. Taught at Georgetown, Boston, and Harvard. (Languages and Literature)
- SIEGEL, IRVING H., (1949). Ph.D., Columbia. Co-Director, American Technology Study, Twentieth Century Fund. (Mathematics and Statistics)
- SIEGEL, JACOB S., (1949). M.A., Pennsylvania. Statistician, Bureau of the Census, Department of Commerce. (Mathematics and Statistics)
- SILVERSTEIN, JULIUS, (1951). LL.B., Columbia. Attorney, Office of General Counsel, General Services Administration. Taught at National Law School. (Public Administration)
- SIMMONS, LANSING G., (1952). B.S.C.E., Maryland. Chief Mathematician, Geodesy Division, U. S. Coast and Geodetic Survey, Department of Commerce. (Technology)
- SIMMS, D. HARPER, (1952). A.B., B.J., Missouri. Director, Information Division, Soil Conservation Service, USDA. (Committee on Publications)
- SKOP, JACOB, (1951). Chief, User Requirements and Development Division, Army Map Service, Department of the Army. (Technology)
- SMITH, STANCL M., (1950). B.S.C., Georgia. Assistant Chief, Internal Audit Division, Army Audit Agency. (Public Administration)
- SNYDER, F. F., (1949). B.C.E., Ohio State. Hydraulic Engineer, Corps of Engineers, Department of the Army. (Technology)
- SNYDER, S. A., (1941). Director, Purchase Division, Federal Supply Service, General Services Administration. (Public Administration)
- SODERLAND, KENNETH W., (1955). M.A., Washington. Serials Cataloger, Descriptive Cataloging Division, Library of Congress. Taught at Washington. (Languages and Literature)
- SORENSEN, WILLIAM F., JR., (1955). A.B., Kalamazoo. Special Assistant to the Executive Director, Civil Service Commission. (Public Administration)
- SOUTHWORTH, H. M., (1945). A.B., Cornell. Research Assistant, Office of Deputy Administrator, Marketing Research and Statistics, Agricultural Marketing Service, USDA. (Social Sciences)
- SPANIER, DAVID H., (1950). M.P.L., National. Organization and Methods Examiner, Hospital Methods Improvement Branch, Office of the Surgeon General, Department of the Army. (Public Administration)
- SPENCER, FRANK H., (1949). Assistant Administrator for Management, Agricultural Research Service, USDA. (Public Administration)
- SPIEKERMAN, ERNEST T., (1953). A.B., Stanford. Organization and Methods Examiner, Bureau of Reclamation, Department of the Interior. (Office Techniques)
- SPLITZER, H. M., (1946). Dr. Juris, Vienna; B.A., Oxford. Author and Lecturer. Formerly Director, Research Institute of Economic Psychology, Vienna. (Social Sciences)
- STARKEY, JAMES H., (1950). B.S., Virginia Polytechnic. Director, Personnel Division, Agricultural Research Service, USDA. (Committee on Correspondence Study and Extension Education)
- STAUBER, B. RALPH, (1931). M.A., Minnesota. Chief, Agricultural Price Statistics Branch, Agricultural Marketing Service, USDA. Taught at Minnesota. (Mathematics and Statistics)
- STEELE, J. GORDON, (1942). Ph.D., Ohio State. Chief, Soil Survey Reports, Soil Conservation Service, USDA. (Correspondence)
- STEINBERG, DANIEL, (1954). Ph.D., Harvard. Acting Chief, Laboratory of Metabolism, National Heart Institute, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Wayne and Boston University. (NIH)
- STEINBERG, JOSEPH, (1942). B.S., City College of the City of New York. Chief, Statistical Methods Branch, Population and Housing Division, Bureau of the Census, Department of Commerce. (Mathematics and Statistics)

- STEPHAN, FREDERICK F., (1946). M.A., Chicago. Director of the Study of Education, Princeton University. Taught at Pittsburgh and Cornell. (Mathematics and Statistics)
- STEPHENS, EDMUND, (1952). M.S., Oregon State. Director, Budget and Finance Division, Agricultural Research Service, USDA. (Office Techniques)
- STERN, HARRIET E., (1953). B.S., Temple University. Secretary to the Director, National Council for Accreditation of Teacher Education. (Office Techniques)
- STEVENS, HENRY, (1946). Ph.D., George Washington. Head, Allergens Section, Eastern Utilization Research Branch, Agricultural Research Service, USDA. (Physical Sciences)
- STOCKER, FREDERICK D., (1955). Ph.D., Cornell. Agricultural Economist, Agricultural Finance Section, Agricultural Research Service, USDA. Taught at Cornell and Lehigh. (Social Sciences)
- STOCKING, E. J., (1946). M.S., Iowa State. Assistant to the Chief, Examining Division, Bureau of Departmental Operations, Civil Service Commission. Taught at South Dakota and Iowa State. (Technology)
- STONE, HAROLD A., (1946). M.S.P.A., Syracuse; M.E., Ohio State. Chief, Management Assistance Branch, Office of the Comptroller of the Army, Department of the Army. (Public Administration)
- SULLIVAN, RALPH H., (1954). M.S. in L.S., Simmons; LL.B., George Washington. Attorney. Taught at Massachusetts Institute of Technology. (Languages and Literature)
- SUPERVIA, G. MEDRANO DE, (1946). Licenciatura en Filosofía y Letras, Universidad de Valencia. Instructor, The Sidwell Friends School. Taught in the schools of Valencia, Spain, and the Dominican Republic. (Languages and Literature)
- SUPERVIA, RAFAEL, (1946). Licenciado in Derecho, Universidad de Valencia. Associate Professor, George Washington University. Taught in Instituto-Escuela, Ciudad Fruijilo, Dominican Republic. (Languages and Literature)
- SWIFT, CLIFTON E., (1954). B.S., Maryland. Biochemist, Agricultural Research Service, USDA. (Agricultural Research Center Committee)
- SWINGLE, MAUDE K., (1955). B.A., Ohio State. Professional Assistant, Botany Department, Smithsonian Institution. (Languages and Literature)
- SYKES, JOSEPH F., (1950). Ph.D., Toronto. Physiologist, Dairy Husbandry Research Branch, Agricultural Research Service, USDA. Taught at Michigan State. (Agricultural Research Center Committee)
- TAEBER, CONRAD, (1953). Ph.D., Minnesota. Assistant Director, Bureau of the Census, Department of Commerce. (Social Sciences)
- TARAKUS, EUGENIA, (1945). Russian Gymnasium and University of Liege. Assistant Professor of Russian, Naval Language School. (Languages and Literature)
- TAYLOR, CARL C., (1937). Ph.D., Missouri. Consultant on Community Development, Foreign Agricultural Service, USDA. Taught at Texas, Missouri, North Carolina State, Brookings Institution, and Catholic. (Social Sciences)
- TAYLOR, PERRY R., (1949). M.S., Massachusetts Institute of Technology. Assistant to the Chief of Water Supply and Water Pollution Program, Public Health Service, Department of Health, Education and Welfare. (Public Administration)
- TEPPER, MORRIS, (1952). Ph.D., Johns Hopkins. Research Meteorologist, Weather Bureau, Department of Commerce. Taught at Brooklyn. (Physical Sciences)
- TERMAN, MAURICE J., (1953). A.B., Columbia. Geologist, U. S. Geological Survey, Department of the Interior. Taught at Columbia, New York University, and Kentucky. (Physical Sciences)
- TEUTON, FRANK L., (1952). B.S., Peabody College. Information Officer, Information Division, Agricultural Research Service, USDA. Taught at Memphis State Teachers. (Committee on Information)
- TEWINKEL, G. C., (1946). M.C.E., Syracuse. Photogrammetric Engineer, Division of Photogrammetry, U. S. Coast and Geodetic Survey, Department of Commerce. Taught at George Washington and Maryland. (Technology)
- THACKREY, FRANKLIN, (1950). M.S., Kansas State. Director, Marketing Information Division, Agricultural Marketing Service, USDA. (Languages and Literature)
- THIGPEN, JAMES E., (1951). B.S., Connecticut. Director, Oils and Peanut Division, Commodity Stabilization Service, USDA. (Social Sciences)
- THOM, H. C. S., (1942). M.S., George Washington. Chief Climatologist, Advisory Committee on Weather Control. Taught at Iowa State, Maryland and Cornell. (Physical Sciences)
- THOMAS, ALMON D., (1950). B.S.E.E., Colorado. Electrical Engineer, Bureau of Power, Federal Power Commission. (Technology)
- TEROOP, VINCENT M., (1954). Ph.D., Chicago. Supervisory Geographer, Geographic and Development Branch, Geography Division, Bureau of the Census, Department of Commerce. (Physical Sciences)
- THURSTON, JOHN H., (1943). Ph.D., Harvard. Administrative Officer, Office of Administrator, Commodity Stabilization Service, USDA. Taught at Northwestern. (Public Administration)
- TILLER, CARL W., (1946). M.A., Minnesota. Chief of Budget Methods, Office of Budget Review, Bureau of the Budget. (Public Administration)
- TITCHEN, ROBERT S., (1955). D.Sc., University of Paris. Operations Analyst, Operations Evaluation Group, Office of the Chief of Naval Operations. Taught at Brooklyn Polytechnic Institute and Stevens Institute of Technology. (Mathematics and Statistics)
- TRELOGAN, HARRY C., (1948). Ph.D., Minnesota. Director, Marketing Research Division, Agricultural Marketing Service, USDA. Taught at Minnesota. (Social Sciences)
- TUTHILL, CHARLES S., (1955). B.S., Cornell. Plant Pathologist, Plant Quarantine Branch, Agricultural Research Service, USDA. (Biological Sciences)

- VARY, WILLARD E., (1955). Graduate, Rochester Institute of Technology. Assistant Head, Specifications and Tests Division, Photographic Center, Department of the Navy. (Technology)
- VETTER, RICHARD C., (1952). M.S., Scripps Institution of Oceanography, University of California. Oceanographer, Office of Naval Research, Department of the Navy. Taught at California. (Physical Sciences)
- VOGELY, WILLIAM A., (1954). M.A., Princeton. Economist, Rand Corporation. Taught at Kenyon. (Social Sciences)
- WADLEY, F. M., (1944). Ph.D., Minnesota. Formerly Statistical Consultant, Bureau of Entomology and Plant Quarantine, USDA. Taught at Minnesota. (Correspondence)
- WAGNER, GLENN D., (1955). A.B., Syracuse. Organization and Methods Examiner, Administrative Division, Rural Electrification Administration, USDA. (Office Techniques)
- WALLENSTEIN, MERRILL, (1955). Ph.D., Utah. Chemist, Material Testing Laboratory, National Bureau of Standards, Department of Commerce. Taught at Utah. (NIH)
- WALLING, HERSCHEL C., (1946). C.P.A., M.B.A., Texas. Systems Accountant, General Accounting Office. Taught at Texas. (Public Administration)
- WALSH, ROBERT M., (1947). B.S., Boston. Chief, Market Development Branch, Marketing Research Division, Agricultural Marketing Service, USDA. (Social Sciences)
- WARD, KATHRYN P., (1945). Ph.D., George Washington. Associate Professor of English, University of Maryland. (Languages and Literature)
- WARD, RAY, (1946). A.P., Washington. Staff Director, Special Subcommittee on Durable Property, House Committee on Government Operations. (Public Administration)
- WARNER, KENNETH F., (1955). M.S., Minnesota. Extension Educationalist, Extension Research and Training Division, Federal Extension Service, USDA. Taught at Minnesota, Colorado, and Maryland. (Special Sciences)
- WATTS, JOHN M., (1955). B.S., Virginia. Director of Civilian Personnel, Department of the Air Force. (Public Administration)
- WAUGH, FREDERICK V., (1939). Ph.D., Columbia. Director, Agricultural Economics Division, Agricultural Marketing Service, USDA. Taught at Cornell and Brookings Institution. (Social Sciences; Committee on Internship Cooperation)
- WAY, EDRIE C., (1954). Registrar, Foreign Service Institute. Taught in Public Schools, Arizona. (Office Techniques)
- WEBER, JOHN A., (1950). B.S.E.E., Cooper Union. Chief, Civilian, Marine Corps Electronics Branch, Bureau of Ships, Department of the Navy. Taught at Maryland. (Technology)
- WEBER, KAY B., (1947). M.A., Catholic. Taught at Quincy College. (Languages and Literature)
- WEBSTER, R. LYLE, (1946). M.S., Columbia. Director of Information, USDA. (Languages and Literature)
- WEINGARTEN, HARRY, (1955). M.A., Columbia. Mathematical Statistician, Electronic Computer Branch, Bureau of Ships, Department of the Navy. Taught at City College of the City of New York, New York University, and George Washington. (Mathematics and Statistics)
- WEISS, MARTIN G., (1951). Ph.D., Iowa State. Chief, Field Crops Research Branch, Agricultural Research Service, USDA. (Biological Sciences; Agricultural Research Center Committee)
- WEITZELL, EVERETT C., (1952). Ph.D., Wisconsin. Chief, Telephone Operations and Loans Division, Rural Electrification Administration, USDA. Taught at Maryland and West Virginia. (Social Sciences)
- WELLS, JOHN L., (1952). Cert., Business Administration, Waterloo Business College. Assistant Director of Finance, Office of Budget and Finance, USDA. (Public Administration)
- WELTNER, EDITH, (1953). A.B., Benjamin Franklin. Supervisor, Voucher Examining Unit, Atomic Energy Commission. Taught at Temple Secretarial School. (Office Techniques)
- WHEELER, JOSEPH C., (1943). M.A., Cincinnati. Director of Finance and Budget Officer, USDA. (Public Administration)
- WHIPPLE, CLAYTON E., (1942). M.S., Cornell. Deputy Administrator, Foreign Agricultural Service, USDA. (Physical Sciences; Social Sciences)
- WHITE, BENNETT S., JR., (1938). Ph.D., Harvard. Research Co-ordinator, State Experiment Station Division, Agricultural Research Service, USDA. Taught at Kentucky, George Washington, and Virginia. (Social Sciences)
- WHITE, ELMO J., (1955). Chief, Art and Graphics Division, Office of Information. (Languages and Literature)
- WIEMER, LEO G. D., (1953). Supervising Architect, Construction Engineering Section, Bureau of Facilities, Post Office Department. (Technology)
- WILBUR, GLEN, (1954). B.A., Washington. Personnel Officer, National Institutes of Health, Department of Health, Education, and Welfare. (NIH)
- WILCOX, FRANCIS O., (1946). Ph.D., Iowa; Dr. Pol. Sci., Geneva. Chief of Staff, Senate Foreign Relations Committee. Taught at Iowa, George Washington, Louisville, Michigan, and School of Advanced International Studies. (Social Sciences)
- WILCOX, WALTER W., (1951). Ph.D., Harvard. Senior Specialist, Agriculture, Legislative Reference Service, Library of Congress. Taught at Iowa State, Wisconsin, Arkansas, and Tennessee. (Social Sciences)
- WILLIAMS, BEN M., (1954). LL.B., Wake Forest. Acting Director, Navy Management Staff, Department of the Navy. (Public Administration)
- WILLIAMS, WILFRED S., (1949). B.F.S., Southern California. Principal Associate, J. L. Jacobs and Company. Taught at Columbus, Southern California, and George Washington. (Public Administration)

- WILSON, M. L., (1938). D.S.C., Montana. Consultant, Ford Foundation. (Social Sciences)
- WINFREY, ROBLEY, (1953). M.S.C.E., Iowa State. Acting Chief, Personnel and Training, Bureau of Public Roads, Department of Commerce. Taught at Iowa State. (Technology)
- WINSTON, JAY S., (1949). M.S., New York. Research Meteorologist, Weather Bureau, Department of Commerce. Taught in Brooklyn College and New York. (Physical Sciences)
- WINTERS, R. Y., (1949). Ph.D., Cornell. Agricultural Administrator, Office of the Administrator, Agricultural Research Administration, USDA. Taught at North Carolina State. (Committee on Internship Cooperation)
- WOLF, A. V., (1954). Ph.D., Rochester. Physiologist, Army Medical Service Graduate School, Walter Reed Army Medical Center. Taught at Albany Medical College. (NIH)
- WOODARD, GEOFFREY, (1950). Ph.D., George Washington. Pharmacologist, Food and Drug Administration, Department of Health, Education and Welfare. Taught at George Washington and Georgetown. (Physical Sciences)
- WRIGHT, BARBARA, (1955). Ph.D., Stanford. Microbiologist, National Heart Institute, National Institutes of Health, Department of Health, Education and Welfare. (NIH)
- WRIGHT, L. KENNETH, (1955). B.Ed., Illinois State Normal. Director, Administrative Services Division, Agricultural Marketing Service, USDA. (Languages and Literature)
- YATES, GALEN, (1954). Chief, Administrative Management Division, Office of Information, USDA. (Committee on Correspondence Study and Extension Education)
- YOUMANS, E. GRANT, (1953). Ph.D., Michigan State. Social Scientist, National Institute of Mental Health, National Institutes of Health, Department of Health, Education, and Welfare. Taught at Michigan State. (Public Administration; Social Sciences)
- YOUNG, GEORGE A., (1954). B.S., Michigan State. Training Officer, Agricultural Marketing Service, USDA. (Committee on Correspondence Study and Extension Education)

Index

- Accounting, 42, 68-72
- Accredited standing, 6
- Administration—
 - budgetary, 63
 - financial, 63, 71
 - general, 60-61
 - Graduate School, 6
 - hospital, 64
 - legal, 66-67
 - personnel, 65-66
 - public, 57-72
 - wage, 66
- Administration Board, 3
- Administrative law and procedure, 66
- Administrative procedure, 41
- Admission, 9
- Aerial photographic interpretation, 50, 91-92
- Agricultural economics, 75-78
- Agricultural policies and programs, 77-78
- Agricultural Research Center Committee, 4
- Agriculture, history, 106
- Algebra, 33, 34
- American Government, 60
- American history, 83, 84
- Analysis, statistical, 36, 75
- Analytic geometry, 33
- Analytical techniques, chemistry, 49
- Animal quarantine laws, 105
- Applied arts, 95
- Applied mathematics, 35
- Art, survey, 95
- Asia, history, 84
- Astronomy, 91
- Attendance, 11
- Audio-visual aids, 23
- Auditing, 41, 71

- Biochemistry, 47, 48
- Biological assay, 106
- Biological sciences, 14-16, 99-100
- Books, great (classics), 21
- Bookstore, Graduate School, inside back cover
- British Commonwealth and U. S., 84
- Budgetary administration, 63
- Budgetary procedure, 43
- Business forecasting, 74
- Business law, 67

- Calculus, 33-34
- Calendar, Graduate School, inside front cover
- Cartography, 92-93

- Certified Statements of Accomplishment—
 - accounting, 69
 - administrative procedures, 40
 - agricultural economics, 76-77
 - editorial practices, 17-18
 - meteorology, 51-52
 - oceanography, 55
 - public administration, 57-60
 - statistics, 31-32
 - surveying and mapping, 89-90
- Chemistry, 47-49, 100-101
- Clerical-administrative procedures, 41-43
- Climatology, 52-54
- Color photography, 97
- Communication, international, 84
- Communication, psychology of, 82
- Computing machines, electronic, 38
- Conference methods workshop, 24
- Contracts, defense, 68
- Cooperation with educational institutions, 7
- Cooperative extension education, 78-79
- Cooperative internship program, 7
- Correspondence management, 44
- Correspondence program, 8, 104-106
- Correspondence Study, Committee on, 4, 104
- Cost accounting, 71
- Council, Graduate School, 3
- Counseling services, 9
- County programs (extension), 79
- Creative writing, 20
- Credit and grades, 12
- Criminal evidence and procedure, 67, 105

- Decoration, interior, 95
- Design, experiments, 15, 37, 38, 106
- Design, landscape, 95
- Design, printing, 22
- Disease classification, 14
- Drafting, statistical, 35, 36
- Drawing, 94

- Economic analysis, 75
- Economic thought, 75
- Economics, agricultural, 75-78
- Economics, general, 74-75
- Editing, 17-18, 22
- Education, extension, 78-79
- Electricity, 86, 88
- Electronic computing machines, 38
- Electronics, 86, 87

- Employee training, 66
- Employment and utilization, 66
- Engineering, 85-88
- Engineering review, 85
- Engineering statistics, 38
- English composition, 19
- English grammar, 18, 19
- Entomology, 14, 15, 16
- Entrance requirements, 9
- Executive development, 66
- Extension education, 78-79
- Extension Education, Committee on, 4
- Faculty, 107
- Far East, history, 84
- Farm forestry, 105
- Feature writing, 20
- Fees, 10-11
- Fiction writing, 21
- Films and film services, 23
- Finance, mathematics of, 71
- Finances, personal, managing, 81
- Financial and budgetary administration, 63, 71
- Financial organization and procedures, 71
- Financial statements, 71
- Fine arts, 94-95
- Fluid mechanics, 53
- Foreign languages—
 - French, 25-26
 - German, 26, 102
 - Italian, 27
 - Portuguese, 27
 - Russian, 27-28, 102
 - Spanish, 28
- Foreign relations, American, 84
- Forestry, farm, 105
- Forms management, 44
- Founding, Graduate School, 5
- Four-H clubs, 79
- French, 25-26
- Gardening, 95
- Geodesy, 91
- Geography, 49
- Geology, 50
- Geometry, 33
- German, 26
- Government accounting, 42, 70
- Government, American, 60
- Government letter writing, 44
- Government supply, 42, 67-68
- Grades and credit, 12
- Graphic methods, statistics, 36
- History, American, 83, 84
- History and international relations, 82-84
- History of agriculture, 106
- Hospital administration, 64
- Human relations, 62, 80-82
- Hydrology, 50, 53, 106
- Improving reading ability, 18
- Indexing, 22
- Information, Committee on, 4
- Information, general, 5-8
- Information methods, 22-23
- Insecticides, pharmacology, 48
- Institution management, 64
- Instructions, writing, 44
- Insurance and risk, agricultural, 77
- Interior decoration, 95
- Internal Audit, Committee on, 4
- International relations, 82-84
- Interns, scholarships, 8
- Internship Cooperation, Committee on, 4
- Internship program, cooperative, 7
- Internships in sampling, 30-31
- Interviewing and questionnaires, 102
- Investigation, legal aspects, 67, 105
- Investment accounting, 71
- Investments, 81, 103
- Italian, 27
- Land-grant institutions, cooperation with, 7
- Landscape design, 95
- Languages and literature, 17-28
- Languages, foreign, 25-28
- Law, administrative, 66-67
- Law, business, 67
- Law, public utility, 88
- Layout design, 22
- Lectures, 7
- Legal administration, 66-67
- Letter writing, 44
- Lettering, 104
- Library techniques, 23-24
- Linear Programming, 34
- Lithography, 96
- Machine tabulation, 36
- Machines, computing, 38
- Management and organization, 61-62
- Management, institution, 64
- Management, scientific, 62
- Managing personal finances, 81
- Map library techniques, 24
- Map projections, 93
- Map reproduction, 93
- Mapping and surveying, 88-93
- Maps and charts, 24, 49, 88-93
- Marketing, 77, 78
- Mathematics, 33-35, 41, 71
- Mathematics and statistics, 29-39
- Meat inspection, 105
- Medical terminology, 14

- Medicine, 99, 100
- Meteorology, 51-54, 56
- National Institutes of Health, 99-103
- Oceanography, 55-56
- Office hours, Graduate School, inside back cover
- Office management, 41
- Office techniques and operations, 40-46
- Officers, Graduate School, 3
- Operations research, 34
- Oil painting, 94
- Organization and management, 61-62
- Painting, 94-95
- Paperwork management, 43-44
- Parliamentary procedure, 25
- Pencil sketching, 94
- Personality, psychology, 81
- Personnel administration, 65-66
- Personnel development, 66
- Personnel procedure, 42, 104
- Petrology and petrography, 50
- Photogeology, 50
- Photogrammetry, 91-92
- Photographic interpretation, aerial, 91-92
- Photography, 95-98
- Physical sciences, 47-56
- Physiology, 15, 100
- Plants, 15, 16, 95
- Portrait painting, 94
- Portrait photography, 97
- Portuguese, 27
- Position classification, 65, 66
- Printing procedure, 22
- Probability, theory, 35
- Procedures—
 - accounting, 42
 - administrative-clerical, 41-43
 - auditing, 41
 - budgetary, 43
 - financial, 71
 - legal, 66
 - personnel, 42, 104
 - printing, 22
 - property, 42
 - purchasing, 42
 - records management, 43
 - systems, 44
 - writing, 44
- Procurement and property management, 67-68
- Property procedure, 42
- Psychology, 80-82
- Public administration, 57-72
- Public speaking, 24
- Public utility law, 88
- Publications, Committee on, 4
- Publications, Graduate School, 8, back cover
- Purchasing procedure, 42
- Purpose, Graduate School, 5
- Quality control, 38
- Quarantine laws, animals, 105
- Quarantine, plant, 15-16
- Questionnaire construction and interviewing, 102
- Radioisotopes, biology, 15
- Rapid Reading, 18
- Records management, 43
- Refunds and withdrawals, 13
- Registration, 10
- Registration dates, inside front cover
- Regulations and procedures, Graduate School—
 - admission, 9
 - attendance, 11
 - counseling services, 9
 - credit and grades, 12
 - entrance requirements, 9
 - fees, 10-11
 - registration, 10
 - transcript of credit, 12
 - transfer of credit, 10
 - veterans, 9
 - withdrawal and refunds, 13
- Report writing, 19-20, 104
- Reports management, 44
- Research methods, 82
- Resource economics, 77
- Russian, 27-28, 102
- Sampling, internships, 30-31
- Sampling surveys, 37, 39, 106
- Scholarships, Federal administrative interns, 8
- Scientific German, 102
- Scientific management, 61-62
- Scientific Russian, 102
- Sculpture, 94
- Secretarial studies, 45-46
- Semantics, 81
- Shorthand, 45-46
- Sketching, 94
- Social psychology, 81
- Social psychology of communication, 82
- Social sciences, 73-84
- Sociology, 80
- Soil sciences, 51
- Soils and soil management, 105
- Spanish, 28
- Specifications, 86
- Speech, 24-25
- Standardization, 86

- Statistics, 35-39, 52, 75, 105-106
Stenography. See Shorthand
Summer session, inside front cover
Supervision, 43, 104
Supply, management, 42, 67-68
Surveying and mapping, 88-93
Surveys, sample, 37, 39, 106
- Tabulation, machine, 36
Tax accounting, 71
Teaching resources, 6
Technical assistance, 82
Technical writing, 20
Technology, 85-98
Telephony, 87
Textbooks, inside back cover
Topographic surveying, 90
Traffic management, 78
Training, 66
Transcript of credit, 12
Transfer of credit, 10
Transistor electronics, 87
Transportation, 78
Trigonometry, 33
- United States and British Commonwealth, 84
United States Government, 60
- Veterans, 9
Visual aids, 23
Vocabulary building, 19
- Wage administration, 66
Water color painting, 94
Weather analysis and forecasting, 54
Withdrawal and refunds, 13
Work standards and measurement, 62
- Writing—
 effective, 19-20
 English composition, 19
 feature, 20
 fiction, 21
 letter, 44
 official, 19-20
 procedures and instructions, 44
 readable, 19
 report, 19-20, 104
 technical, 20

SCHOOL ADDRESS: Room 1031, South Agriculture Building, 14th Street and Independence Avenue, Washington 25, D. C.

OFFICE HOURS: 9:00 A.M. to 6:15 P.M. Monday through Friday.

TELEPHONE: Republic 7-4142, Extension 6337.

CLASSES: Most classes meet in the evening. For exact time of classes, see semester supplement, *Schedule of Classes*.

CLASSROOMS: Classroom assignments are given the student at the time of registration.

BOOKSTORE: Textbooks may be purchased at the Graduate School bookstore, Room 1022, South Agriculture Building. See *Schedule of Classes* for hours.

PUBLICATIONS OF THE GRADUATE SCHOOL

PUBLIC ADMINISTRATION

LEGISLATIVE-EXECUTIVE RELATIONSHIPS IN THE GOVERNMENT OF THE UNITED STATES.

The first series of William A. Jump-I. Thomas McKillop Memorial Lectures in Public Administration presented by: Marvin Jones, Chief Judge, U. S. Court of Claims; Ernest S. Griffith, Director, Legislative Reference Service, Library of Congress; Congressman Clifford R. Hope; Earl D. Johnson, Under Secretary of the Army; Frederick J. Lawton, U. S. Civil Service Commissioner; Congressman Melvin R. Laird; Senator George D. Aiken; Ezra Taft Benson, Secretary of Agriculture. Paper bound (1954), 64 pages. \$1.50.

LECTURES ON ADMINISTRATIVE REGULATION. Lectures delivered by Lloyd K. Garrison, Thomas Blaisdell, Paul H. Appleby, Fowler Harper, Clarence Kitchen, and Jacob Rosenthal. Paper bound (1945), 80 pp. 50c.

AS I SEE IT: Observations of a Civil Servant by Warner W. Stockberger. Fifty short essays on public administration, especially personnel administration, written by the "dean of personnel administrators" in the Federal service. Paper bound (1941), 50 pp. 35c.

ELEMENTS OF PERSONNEL ADMINISTRATION. Lectures, with accompanying problems and discussions, by eight outstanding leaders in this field, including White, Tead, Feldman, Person, and Stockberger. Paper bound (1935), 102 pp. 50c.

STATISTICS

LECTURES AND CONFERENCES ON MATHEMATICAL STATISTICS AND PROBABILITY by Jerzy Neyman, Professor and Director of Statistical Laboratory, University of California, Berkeley. Second edition, revised and enlarged. Cloth bound (1952), 274 pp. \$5.00.

STATISTICAL METHOD FROM THE VIEWPOINT OF QUALITY CONTROL by Walter A. Shewhart, edited by W. Edwards Deming. Cloth bound (1939), 155 pp. \$2.50.

ON THE STATISTICAL THEORY OF ERRORS by W. Edwards Deming and Raymond T. Birge. Paper bound (1938), 50 pp. 40c.

INTRODUCTION TO EXPERIMENTAL STATISTICS by Walter A. Hendricks, Agricultural Marketing Service, U. S. Department of Agriculture. Mimeographed. Paper bound (1953), 251 pp. \$3.75.

GENERAL

SPIRIT AND PHILOSOPHY OF EXTENSION WORK AS RECORDED IN SIGNIFICANT PAPERS. A collection of outstanding papers contributed by leaders in the State and Federal Extension Service. Edited by R. K. Bliss, Director Emeritus, Iowa State Extension Service. Published jointly with Epsilon Sigma Phi. Cloth bound (1952). \$4.50.

PROGRESS IN THE FIELD OF ANTIBIOTICS. Edited by H. T. Herrick and George W. Irving, Jr. Available from Chemical Publishing Co., Brooklyn, N. Y.

Quantity Discount: Less than 10 copies, no discount; 10-20 copies, 10%;
over 20 copies, 20%.

Make checks and money orders payable in advance to

GRADUATE SCHOOL
U. S. DEPARTMENT OF AGRICULTURE
Washington 25, D. C.